THE MARINE RECORD

$2.00 PER YEAR. ESTABLISHED 1878. 10c. SINGLE COPY.

VOL. XVIII. CLEVELAND, OHIO, DECEMBER 19, 1895. NO. 51

LIEUT. BLOW ORDERED TO SEA.

(ILLUSTRATED.)

Lieut. George P. Blow has been ordered by the Navy Department from the charge of the Branch Hydrographic Office at Chicago to sea duty on the battleship Texas. This will occasion some surprise and not a little pain to the friends of the Lieutenant and of hydrographic work on the Great Lakes. The Texas is now making some preliminary runs in the vicinity of New York, and will probably leave soon on an extended cruise when her complement of officers and men has been made up. Lieut. Blow's orders take effect to-morrow, the 20th inst., and he will be transferred to sea duty at once.

Lieut. Blow was entrusted with the work of installing the lake branches of the Hydrographic Office at Chicago, which service he has performed eminently to the satisfaction of the office at Washington, and to the lake interests in general, to which the office has been especially serviceable. Lieut. Blow also installed the Cleveland branch, remaining long enough to give it a good start and it has since been ably maintained by Ensign W. C. Cole. Lieut. Blow will leave the lakes with the best wishes and to the sincere regret of the entire lake marine fraternity.

Lieut. Blow entered the U. S. Navy in 1876, making his first cruise on the U. S. Essex to the west coast of Africa, and to the Atlantic and Pacific coasts of South America. He received his commission in 1883, after which he made a cruise in the tug Pinta from Portsmouth to San Francisco. He was then ordered to the Norfolk navy yard, where he commanded tugs and performed other general utility service. He then made a cruise on the European station in the U. S. S. Pensacola, afterward returning to the Norfolk navy yard as aide to Admiral Brown. He was later on duty in New York harbor, as assistant supervisor in charge of the anchorage of vessels and preventing the dumping of mud and refuse in New York harbor. Following this he was put in charge of the New York branch Hydrographic Office. He was secretary to Admiral Brown during the Hawaiian and Chilean troubles on the Pacific station, when the squadron comprised the ships Charleston, San Francisco, Thetis and Michigan. When the World's Columbian Exposition opened Lieut. Blow was placed in charge of the navigation exhibit. He later established the Chicago and Cleveland branch Hydrographic offices, and has been continuously on lake duty since. He represented the Navy Department at the Toronto, Cleveland and Vicksburg deep waterway conventions, and has everywhere made a most agreeable and lasting impression.

The successor of Lieut. Blow has not been detailed, and until the position is filled the office will be in charge of Mr. W. J. Wilson, Lieut. Blow's assistant.

HOW TO GO THROUGH THE ICE.

Capt. Orville Green, on his last trip down on the steel steamer Griffin, encountered considerable ice at the head of Lake Erie. He bucked it under check for a short time, with considerable difficulty, but after awhile opened up at full speed, when he found that the water driven ahead by the steamer, and ordinarily forming the "bone," went forward under the ice, which was at least five inches thick and as clear as glass, and broke it up for about twelve feet ahead of the boat's stem, sending the cakes over the solid ice and out of the way. Not a plate was damaged, but Capt. Green had taken the precaution to lower his anchor chains until the bight hung down below the water line on each bow, and formed additional protection.

SHIPMASTERS' TRIP TO WASHINGTON.

There has arisen a slight misunderstanding among the members of the Shipmasters' Association relating to the necessary expense involved in attending the annual meeting of the association, which is to be held at Washington on January 15. The impression got abroad that the expense of the trip would run up to $45 or $50

LIEUT. GEORGE P. BLOW.

for each person, and many felt this to be prohibitive. As a matter of fact, the fare from Cleveland for the round trip, on this occasion, will be $16 or $17 for each. Sleeping car fare is $2 each way, or $4 for the round trip, and can be dispensed with by many who prefer a daylight ride. Living expenses at Washington are as reasonable as at any city in the land, so that the entire expense will range from $22 to $30 for each, according to the accommodations secured. If enough of the masters and their wives can arrange to go in parties, still better rates can be secured. Those who intend going from Duluth, Wisconsin points, and Chicago, will find it cheaper to go direct to Pittsburg; but it has been suggested that members from Michigan and Northern Ohio should arrange to start together from Cleveland.

PPOPOSITION FOR WIND SIGNAL LIGHTS.

The Weather Bureau has submitted this week a proposition, or rather a suggestion to the Lake Carriers' Association, which will be laid by President Livingston before the annual meeting on January 15. The suggestion is that a light of some power, placed at the top of the Mabley building, Detroit, would be of undoubted service to the vessels, if used in indicating by flashing signals, wind and weather predictions, which could be read from the mouth of Detroit River to the St. Clair Flats canal. The use of a search light for this purpose was at one time suggested, but tests which the Weather Bureau has made with this kind of a light have not proven successful.

The lights which it is possible for the Weather Bureau to furnish with the funds at its command would not be powerful enough to be visible at the mouth of the river, and the bureau has asked the Lake Carriers' Association, if the organization thinks it of sufficient value to the lakes to warrant the Lake Carriers in paying a sum of money toward the support of the light. This is about the only available point on the lakes where such a light could be operated without conflicting with the rules of the Light-house Board. All the money that is desired is for the construction of the light, which will be taken in charge by the office force of the Detroit station, and operated by them.

Vessel men have often suggested that by some such means they would be able to obtain prompt warnings of storms after passing Detroit, and sometimes when lying weather-bound at the head of Lake Erie.

In the published accounts of this movement on the part of the Weather Bureau the latter has been unwittingly misrepresented, rather by inference than otherwise. The bureau merely takes the position of extending a courteous offer, agreeing to bear a portion of the expense involved, and to maintain the service, if the Lake Carriers desire it sufficiently to pay the cost of construction.

OUR SUGGESTION RATIFIED.

To the Editor of The Marine Record:

Your article recently published in reference to the schooner Mike Corry is all O. K. and I hope it may be the means of the adoption of a better mode of signaling between sailor men and the stations. In this case, however, as you surmised, the master and crew of the Corry did wish to land previous to the schooner's losing her deck load down to the rail, as she was laboring heavily.

H. D. FERRIS,
Keeper Point aux Barques L. S. Station.

The tug R. R. Endress, purchased of C. Endress & Sons at the Soo last week by the Masons and George Slining, arrived here early this week after a rough passage and is now in winter quarters near the Davis & Mason mill. In the Endress the boys have a craft they may be proud of. She is large and roomy, has ample power, and, best of all, is in good condition. She will be used to do towing on the bay next season.—Gladstone Delta.

ZENITH CITY-VICTORY COMPARISONS.

The following paper, by Passed Assistant Engineer B. C. Bryan, appears in the November number of the American Society of Naval Engineers:

These vessels were built for carrying freight on the Great Lakes. Their hulls were built by the Chicago Ship Building Company, and the machinery by the Cleveland Ship Building Company. The Victory has Scotch boilers built by the latter company, and the Zenith City, water tube boilers of the Babcock & Wilcox Company's marine type. The Victory went into service early in August, 1895, and the Zenith City in September, 1895, and since that time both boats have been running practically continuously.

The principal dimensions of hulls and machinery of both boats are given in the following table:

Length, keel, feet	380
over all, feet	400
Beam, molded, feet	48
Depth, molded, feet	28
Registered tonnage, Zenith City, tons	3 429
Victory, tons	3 340
Displacement at 16 feet draught, tons	6,617.9
Block coefficient at 16 feet draught	.813
Midship coefficient at 16 feet draught	.981
Water line coefficient at 16 feet draught	.896
Center of gravity of water line from stern to whole length	.507
buoyancy from stern to whole length	.498
above base to height of water line	.529
Metacenter above base line, feet	20.17
Tons per inch at 16 feet water line	37.61
Engines: Triple-expansion, vertical, jet condensing:	
Cylinders, H. P. Zenith Ctiy, inches	22
Victory, inches	23
I. P. inches	28
I. P. inches	63
Stroke, inches	40
Valves, H. P. piston, diameter, inches	10¾
length of port, inches	2¾
I. P. slide	
steam ports, 2 inches	1½×36
exhaust port, 1, inches	4¾ 36
L. P. slide	
steam ports, 2. inches	2¼×60
exhaust port, 1, inches	6¾×60
Piston rods, diameter, Zenith City, inches	5⅛
Victory, inches	5
Air pump, single acting, lifting, diameter, inches	31
stroke, inches	15¾

Boilers:	Zenith City.	Victory.
Type	Babcock & Wilcox.	Scotch.
Number	2	2
Diameter, feet an inches	...	14-8
Length, feet and inches	8-7¾	13-6
Breadth, feet and inches	12-2	.....
Height, feet and inches	14-8	.....
Number of furnaces in each	1	3
Grate surface, total, square feet	134	144
Heating surface, total, square feet	6 800	5,715
H.S. to G.S.	50.7 to 1	39.6 to 1
Diameter of tubes, inches	4 and 2	3½
Weight with water, etc., in steaming condition, pounds	173,876	335,787
Weight per square foot of heating surface, pounds	25.57	58.7

Their hulls are precisely alike except that the water bottom of the Victory is 6 inches deeper than that of the Zenith City. They were built solely and entirely for the purpose of carrying freight, and everything in the design has been subordinated to that end. They have but one deck, the interior of the hull being strengthened by stringers and longitudinals and partial bulkheads. The framing is entirely of channel bars.

For ease in stowing and discharging cargo, the engines and boilers are placed at the extreme after end of the vessels. At the extreme forward end are the quarters for the crew, leaving all the rest of the hold free and unobstructed. There are 11 hatches, 8 by 33½ feet, for the purpose of receiving and discharging cargo.

All the plates of the hulls are lapped and treble riveted along the ends and double riveted along the sides. Filling pieces or liners, triangular in section, are used where three sheets meet instead of drawing out the sheets themselves. The laps in all cases point aft,

The machinery of the two vessels is almost the same; in fact, the engines were built from the same patterns, the only difference being that in the Zenith City the high-pressure cylinder was cored for a diameter of 22 inches instead of 23 to compensate for the higher steam pressure. The cylinders are not steam jacketed. The Zenith City has also an independent feed pump, while that of the Victory is attached to the air-pump beam.

In the construction of the machinery of these vessels economy was carried to the utmost, and there is no hand or machine work in any place where it can be avoided. The crank webs are steel castings bored out and shrunk on the pins and shafts. The main bearings have on brasses, being cored out for the reception of white metal, which is first run in and afterwards bored out. The crank pin ends of the connecting rods contain steel shells for the reception of white metal, and no brass is used in any portion of the engine where it can be avoided. The thrust bearing is an ordinary horseshoe thrust, 6 collars on the shaft working against 5 horseshoes. All the jaws on small connections are castings which are bored out and tapped on the ends of the rods. The trials of the machinery of these vessels were conducted by Chief Engineer J. H. Perry and Passed Assistant Engineer B. C. Bryan, U. S. Navy, in October last. The vessels were running on their regular trips at the time, remaining in port only a few hours to load or dischaage cargo. The testing apparatus used was such as could be applied without delaying the vessels. The results of these trials are tabulated in tables A, B, C, D and E.

Each vessel was supplied with a 3-inch Worthington water meter fitted in the feed pipe between the pump and boiler, and the piping so arranged that the feed water could be passed through or around the meter at will. On the Zenith City the meter was in constant use, and frequent readings showed it to be running regularly and uniformly.

The exact number of pounds of water corresponding to one division on the index of a meter can only be determined by weighing the amount actually passed through in a given time, under pressure and at the rate at which the meter was run during the trial; and such a test can only be made when there are adequate means for weighing or measuring all the water passed for a period of several hours. It was intended that after the trial the meter from each vessel should be returned to the maker and subjected to such a test; but as the meter on the Victory was disabled on a previous trip the meter from the Zenith City was transferred and fitted in its place. For one day it ran satisfactorily, but on the second day, just before the trial began, the casing burst, and the meter was rendered useless. This disabling of both meters rendered it impossible to measure the water evaporated in the boilers of the Victory.

The meter from the Zenith City will be repaired and tested, if possible, and a rate established, though it is evident from the results given in Tables A and B that its error is not very great.

Tests for entrained water in the steam were made with a Heisler throttling calorimeter, taking steam from the main steampipe at the forward engine-room bulkhead in each vessel, and at a distance of from 14 to 18 feet from the boilers; the steam being taken through a pipe tapped into the main steam pipe with perforations about 1 inch from the circumference of same. These tests were not entirely satisfactory, owing to defects in the arrangement of apparatus; but observation of the jets of steam issuing from the calorimeter showed that the steam from the boilers of the Zenith City was at all times drier than that from the boilers of the Victory. The tabulated results showed that the amount of moisture in the steam averaged about $\frac{3}{10}$ of 1 per cent for the boilers of the Zenith City and about $2\frac{3}{4}$ per cent for the boilers of the Victory.

It will be noticed from Tables C and E that the engine of the Zenith City made three revolutions more per minute, under practically the same conditions of wind and sea, than the Victory, while developing 284 I.H.P. less. As the propellers of the two vessels are of the same diameter and surface this can only be explained by supposing the blades of the Zenith City's propeller to have been set at a less pitch. This view is strengthened by noting the slip of the two wheels.

All the coal consumed on the various runs with both vessels was carefully weighed on platform scales, and the ashes therefrom were weighed dry on the same scales.

Each of the two boilers of the Victory contains three furnaces, formed of Adamson rings, four feet in diameter and of sufficient length for Ætna grates of six feet. The furnaces debouch into a single combustion chamber 34 inches deep. The water space back of the combustion chamber is but 5 inches in width at the lower part; the connection sheet is stayed to the head by screw stays, riveted over, spaced 5½ inches horizontally and vertically. The tubes are 3½ inches diameter and are spaced 4½ inches, center to center. Between the center and each side furnace one row of tubes is spaced 6 inches horizontally to improve the circulation of the water. The tubes are carried higher and further toward the side of the boiler than is usual in marine practice; yet, when nearly 29 pounds of coal were burned per square foot of grate per hour, there was no serious priming, though the steam contained considerable moisture, as was shown by the dripping from all the valve stem stuffing boxes. The draft was remarkably good, considering the height of smoke pipe (about 50 feet above grate), being at times as high as $\frac{4}{10}$ inch of water, and the Ætna grates gave no trouble and were well spoken of by the engineer force of the vessel. The boilers are set entirely above the fire-room floor; making it difficult to fire the four side furnaces with the grate bars at such a height. They are designed for a working pressure of 175 pounds per square inch by gauge. The performance of the boilers was remarkably good, as appears from Tables D. and E.

The boilers of the Victory weigh, with water, in steaming condition, but without smoke pipe, 335,787 pounds. This corresponds to a weight of 175.8 pounds per I. H. P. (at the I. H. P. in Table E), and 58.7 pounds per square foot of heating surface.

The two boilers of the Zenith City are of the Babcock and Wilcox marine type. Each contains ninety 4-inch and three hundred and ninety-six 2-inch water tubes, each 8 feet in exposed length between headers; twenty 4-inch tubes, 4 feet 7½ inches long, for carrying the steam to the drum, and one hundred and thirty-two tubes, each 2 inches diameter and 4 feet in length, forming the feed water heater in uptake. The sides of the boilers are formed of square tubes for the height of the furnace and round tubes above, all expanded into headers. Outside of these tubes the boilers were clothed with magnesia, and so perfect was the insulation that the boiler casing never became warm enough to burn the hand.

All the headers are made of lap welded tubing flattened and with ends closed by pieces welded in. All

TABLE A.

ZENITH CITY.

9 A. M. October 20th to 9 A. M. October 25th.

Time, hours	24
Revolutions, total	126,010
per minute	87.5
I. H. P. of engine, average	1,540.19
per square foot grate	11.5
H. S. per I. H. P., square feet	41.4
Steam, engine, gauge, pounds	190 75
1st receiver, absolute, pounds	57 7
2d receiver, absolute, pounds	20 12
Links, from full throw, H. P., inches	3¾
I. P., inch	1
L. P., inch	⅝
Throttle	10
Vacuum, inches	22.6
Temperature, fire room, degrees	66.1
injection, degrees	43.2
discharge, degrees	116 5
feed at boiler, degrees	188.7
Coal, total, pounds	83 420
per hour, pounds	3,475 83
per square foot grate, pounds	25.94
I. H. P., pounds	2.256
Ashes, total, pounds	7,341
per cent of fuel	8.8
Draft in smoke pipe, water, inches	.293
Meter, total water, cubic feet	9,519
water per hour, cubic feet	396.625
total (temperature 116.5 degrees), pounds	588,179.01
per hour (temperature 116.5 degrees), pounds	24 507.46
pound, coal, pounds	7.05
I. H. P. per hour, pounds	15 91
Calorimeter, gauge, pounds	183.3
thermometer, upper, degrees	380.5
lower, degrees	289 08

Strong head wind and light sea rom 9 A. M. till 7 P. M. 20th, then moderating. Vessel very easy and engines racing but slightly.

From 9 till 9 A. M. 21st, light variable wind and smooth sea.

Dynamo running from 4:15 P. M. till end of run. Steam on heaters. Donkey pump running 2 hours 38 minutes to discharge ashes.

A number of the compartments were filled at start and were pumped out after weather moderated.

The coal and water per I. H. P. are quotients derived from dividing the coal and water per hour by the I. H. P. and are, therefore, too great by the amounts used for auxiliary purposes, which could not be determined.

TABLE B.

ZENITH CITY.

Whitefish Point to Maritou Island.

Time, hours and minutes	9.56
Distance, nautical miles	113 5
Speed, knots	11 43
Slip of propeller [pitch, 16 feet], per cent	15.78
Revolutions, total	51,215
per minute	85 93
I. H. P. of engine, average	1,607.25
per square foot grate	12
H. S. per I. H. P., square feet	4 23
Steam, engine, gauge, pounds	195 2
1st receiver, absolute, pounds	59 9
2d receiver, absolute, pounds	20 9
Links, from full throw, H. P., inches	3¾
I. P., inch	1
L. P., inch	⅝
Throttle	10
Vacuum, inches	22.85
Temperature, fire from, degrees	62
injection, degrees	44.2
discharge, degrees	117 8
feed at boiler, degree	182.5
Coal, total, pounds	35,388
per hour, pounds	3,562.55
per square foot grate, pounds	26 586
knot, pounds	311.79
I. H. P., pounds	2.216
Refuse from coal, per cent	8 8
Draft in smoke pipe, water, inch	288
Meter, water, total, cubic feet	4,014 5
per hour, cubic feet	404 144
total [temperature 117.8 degrees], pounds	247,775.67
per hour [temperature 117.8 degrees], pounds	24,963.99
pound coal, pounds	7.007
I. H P. pounds	15 54
Colorimeter, gauge, pounds	188.9
thermometer, upper, degrees	381.6
lower, degrees	290.3

Strong wind ahead, light sea; vessel easy; engines racing very slightly; a number of compartments filled.

The coal and water per I. H. P. are the quotients derived from dividing the coal and water per hour by the I. H. P. and are, therefore, too great by the amounts used for auxiliary purposes and which could not be d termined.

connection of headers with each other is by means of short expanded nipples.

Each Babcock and Wilcox tubulous boiler occupies a floor space of 12 feet 2 inches front, 8 feet 7¾ inches deep and 14 feet 8 inches to top of heater. The front and back incline 2 feet 6 inches from the base, owing to the inclination of the headers and tubes. The uptakes receding from the center of the fire room makes the latter remarkably cool and well ventilated, as well as roomy.

TABLE C.

ZENITH CITY.

Time, hours	3
Revolutions, total	16,470
per minute	91.5
I. H. P. of engine, average	1,626.45
per square foot grate	12 14
H. S. per I. H. P., square feet	4 18
Steam engine, gauge, pounds	191 66
1st receiver, absolute, pounds	55.7
2d receiver, absolute, pounds	20 5
Links, from full throw, H. P., inches	3¾
I. P., inch	1
L. P., inch	⅝
Throttle	10
Vacunm	22.5
Temperature, fire room, degrees	70
injection, degrees	42
discharge, degrees	117.3
feed, degrees	195
Coal, total, pounds	10,670
per hour, pounds	3,556 7
per square foot grate, pounds	26 54
I. H. P., pounds	2 187
Ashes, per cent of coal	8.8
Draft in smoke pipe, water, inch	.313
Meter, water, total, cubic feet	1,218
per hour, cubic feet	406
total, temperature [117.3 degrees], pounds	732,480 4
per hour, [temperature 117.3 degrees], pounds	250,826.8
per pound coal, pounds	7.052
per I. H. P., pounds	15.42
Calorimeter, gauge	....
Thermometer, upper, degrees	382 3
lower, degrees	288 67

Light breeze, smooth sea. Distance could not be obtained as vessel was in open lake where no ranges could be taken

No water in compartments. Steam on heaters.

The coal and water per I. H. P. are the quotients derived from dividing the coal and water per hour by the I. H. P, and are too great by the amounts used for auxiliary purposes and which could not be determined.

The total weight of the two Babcock and Wilcox tubulous boilers, including water and all fittings, ready for steaming, is 173,876 pounds, or 106 pounds per I. H. P. (at the I. H. P. given in Table C). and 25.57 pounds per square foot of heating surface; the boilers are. however, capable of developing considerable more power.

There is a Westinghouse air compressor fitted in the engine room, which discharges into a supply tank bolted to the fire room bulkhead. From this tank, pipes run to the corners of each boiler and terminate in jets inside. To clean the tubes it is only necessary to open the valve in the air supply pipe, when the soot will be blown off the tubes and carried up the smoke pipe without dust or dirt in the fire room or interfering with the firemen tending their fire.

The grate surface in each Babcock and Wilcox tubulous boiler was orginally 72 square feet; but this was reduced by a 9-inch wall of fire brick, dividing the furnace in two parts, to 67 square feet. The heating surface is 2,800 square feet in the boiler proper and 600 square feet in the feed heater, or 3,400 square feet in all.

All the tubes are expanded into the headers and the openings opposite the 4-inch tubes are closed by inner and outer plates and bolts, the joints being metal and metal; the openings opposite the 2-inch tubes are closed by screw plugs.

In service these boilers gave no trouble whatever. They carried their water steadily, and with only ordinarily good firing they will furnish all the steam at 200 pounds pressure that the engine can use. During the trial the safety valves lifted so frequently as to make the steam wasted a very appreciable quantity, and this loss is due entirely to irregular firing.

On both vessels the oiler was also the water tender, and it was not observed that the Babcock and Wilcox tubulous boilers required much more or closer attention than did the Scotch boilers to preserve a constant water level.

The coal used on each vessel was a good quality of free burning Pittsburg, or Western Pennsylvania, semi-bituminous, which gave off large quantities of very dark brown smoke and formed a moderate amount of clinker in the furnaces. It contained a large amount of lump, and required little or no working in the furnace after firing.

The power developed by the Victory's engine in the run from Devil's Island to Two Harbors, and given in Table E, may be taken as the very greatest it can develop, for the throttle was wide open, all the links were in full throw, and the steam was carried at the highest pressure allowed. The boilers of the Zenith City can easily be made to supply sufficient steam for this power, though for the reasons previously given, the corresponding revolutions per minute of the engine will be much greater.

The number of expansions in the Zenith City's engine during the run given in Table C was 24; the number in the Victory's engine during the run given in Table E was 16.

The drop from the boiler pressure to the initial pressure in the high pressure cylinders, as shown by the indicator cards of both vessels, was excessive, being in each case about 20 pounds at the highest powers developed by the engines. The openings for steam pipes were seven inches diameter, which would give a steam velocity per second, at 90 revolutions of the engines per minute, of about 100 feet for the Zenith City and about 110 feet for the Victory, which is not excessive. There may be some contraction in the passages through the throttle valve which may partly account for the drop.

It is probable, however, that this drop in the cards is largely caused by the location of the indicator openings. These openings on the high pressure cylinders are in the steam ports close to the valves, and their lead is such that the steam flows by them and away from the openings. With steam pipes as large in diameter and as short and with as straight leads as those on these vessels, a drop of more than five or six pounds between the boilers and cylinders would not be expected. This excessive drop shown by the indicators reduces the I. H. P. and consequently the performance shown by the engines.

The vacuum was remarkably poor for jet condensers, vertical lifting air pumps and cold injection water, in both vessels. This was slightly offset in the Victory by the higher temperature, about 20 degrees, of the discharge water, corresponding roughly to about 2 per cent in evaporation. An increase in vacuum of 4 inches would increase the power of the engines about 100 I. H. P. at 90 revolutions, or decrease the expenditure of coal for the present power 2 tons a day.

TABLE D.

VICTORY.

2 45 P. M. to midnight, October 27, 1895.

Time, hours and minutes.	9 15
Revolutions, total	47,725
per minute	85 99
I. H. P. of engine, average	1438.8
per square foot grate	9 99
H. S. per I. H. P., square feet	3 97
Steam, engine, gauge, pounds	168 3
1st receiver, absolute, pounds	60 5
2d receiver, absolute, pounds	21.75
Links from full throw, H. P., inches	2 5-16
I. P. and L. P.	Full.
Throttle	10
Vacuum, inches	21.65
Temperature, fire room, degrees	75.9
injection, degrees	44.9
discharge and feed, degrees	137.7
Coal, total, pounds	29.967
per hour, pounds	3,242 92
per square foot grate, pounds	22.52
I. H. P., pounds	2.24
Ashes, total, pounds	2,234
per cent of coal	7.45
Draft in smoke pipe, water, inch	.364
Meter	Broken.

Run concluded at 12 midnight on account of inclemency of weather, which obliged vessel to seek harbor.

At start, moderate wind ahead and light sea; wind and sea increasing till 6 P. M., when wind was strong from ahead with rough sea, and so coutinued till end of run.

From 6:30 till 7:15 engines raced badly and were regulated by throttle; from 7:15 the racing was moderate till 11 30, when it again became necessary to regulate speed by the throttle.

At start H. P. link in 1⅝ inch, others full. At 7:15 H. P. link run in to 3 inches from full throw.

At 7 began filling double bottom compartments with water to steady ship capacity of double bottom 2,500 tons.

Safety valves lifted at intervals during run. Water in gauge glasses 10¾ S., 7½ P., at start, 6 inches in both at end.

Steam on heaters during entire time of run. Donkey pump running 30 minutes to discharge ashes. Dynamo running from 3:40 P. M.

The coal per I. H. P. is too great by the amount used for auxiliary purposes and which could not be determined.

The meter casing burst just as the trial commenced.

The independent feed pump of the Zenith City was run continuously at a speed sufficient to deliver at least twice the water required for the boilers, the surplus being discharged through the relief valve; consequently the expenditure of steam for this purpose is much greater than in the Victory, where the feed pumps are worked from the main engine.

It is to be regretted that there were no means by which the coal used for auxiliary purposes, such as heating ship, running pumps, dynamos and steering engine could be determined even approximately, as the amount would appreciably affect the coal per I. H. P. given in the tables.

Each vessel is supplied with the following auxiliaries:

2 ballast pumps, duplex, inches	12 by 16 by 18
1 auxiliary pump, duplex, inches	8 by 4 by 10
1 steam steering gear, 2 cylinders, inches	7 by 7
2 dynamo engines, single cylinder, inches	6 by 6
1 capstan, forward, 2 cylinders, inches	9 by 8
1 capstan, aft, 2 cylinders, inches	6 by 8
1 blower, 40-inch fan	
In addition to the above the Zenith City has 1 feed pump, duplex, inches	10 by 5 by 12

In compliance with a very common custom on the lakes, the boilers and coal bunkers of both vessels are supported on platforms raised 6½ feet on the Victory, and 8 feet on the Zenith City, above the inner bottom in order that the space underneath may be utilized for cargo. Raising the boilers is of advantage in giving a better ventilated fire room and a direct entrance from engine room to hold, but has disadvantages also.

All the main bearings and the thrust bearings on both ships are lubricated with solid lubricants forced in from the cups which were provided with a plug or piston for this purpose. The crank pins, crossheads and the smaller bearings were lubricated with mineral oil. A small dribble of water was run on the eccentrics and thrust bearings as a precaution, but there was no sign of heating in any bearing during the trip.

TABLE E.

VICTORY.

Devil's Island Light to Two Harbors.

Time, hours and minutes	3.1
Distance, nautical miles	38
Speed, knots	12.59
Slip of propeller [pitch 16 feet] per cent	10
Revolutions, total	16,000
per minute	88.4
I. H. P. of engine, average	1,910.8
per square foot grate	13 26
H. S. per I. H. P., square feet	2.99
Steam, engine, gauge, pounds	170
1st receiver, absolute, pounds	72.2
2d receiver, absolute, pounds	25.2
Links	Full.
Throttle	10
Vacuum, inches	22
Temperature, fire room, degrees	79 3
injection, degrees	43
discharge and feed, degrees	138
Coal, total, pounds	12,754 5
per hour, pounds	4,188 3
per square foot grate, pounds	28.94
knot, pounds	330 9
I. H. P., per hour, pounds	2.18
Refuse from coal, per cent	7 45
Draft in smoke pipe, water, inch	.33
Meter	Broken.
Calorimeter, gauge	
thermometer, upper, degrees	372 3
lower, degrees	238 3

Fresh breeze on bow; smooth sea; compartments filled, also water in hold.

Steam on heaters. Both compartment pumps running, taking warer from hold

The coal per I. H. P. is the quotient derised from dividing the coal per hour by the I H. P and is too great by the amount required for auxiliary purposes.

NOTICE.

The annual meeting of the American Society of Naval Engineers for the election of officers for 1896, and the transaction of other business, will be held at the Navy Department, Saturday, January 11, 1896. Members who cannot be present are requested to send proxies.

R. S. GRIFFIN, Sec. and Treas.

IT is rumored that Congress will consider a bill giving naval officers the privilege of the 30-year retirement clause for five years.

VISIBLE SUPPLY OF GRAIN.

As compiled for THE MARINE RECORD by George F. Stone, Secretary Chicago Board of Trade, December 14, 1895.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY Bushels.
Albany	.....	17,000	135 000	.....	80 000
Baltimore	520 000	1.424 000	217,000	104.000	.....
Boston	1,016 000	277 000	10.000	.....	.....
Buffalo	3,725.000	233,000	80,000	487.000	2 633,000
" afloat	.....	.....	.....	.....	.....
Chicago	21 112 000	828 000	514 000	226,000	24 000
" afloat	.....	.....	61,000	.....	.....
Cincinnati	42,000	2 000	27,000	36 000	79 000
Detroit	375.000	4.000	23.000	15,000	10,000
" afloat	.....	.....	.....	.....	.....
Duluth and Superior	6.025.000	.....	497 000	123 000	119,000
" " afloat	512 000	.....	.....	.....	.....
Indianapolis	92 000	78 000	.....	.....	.....
Kansas City	1 375 000	5.000	30,000	28,000	.....
Milwaukee	739,000	.....	.....	187 000	40,000
" afloat	.....	.....	.....	.....	.....
Minneapolis	17 628 000	25 000	689,000	140 000	136,000
Montreal	246 000	9,000	91,000	3.000	11,000
New York	8 306 000	662 000	1.886 000	49,000	110.000
" afloat	1,197 000	313,000	64,000	.....	355,000
Oswego	24 000	32 000	.....	.....	174.000
Peoria	67 000	81.000	296 000	1.000	.....
Philadelphia	526,000	370.000	133.000	.....	.....
St. Louis	1,303 000	48 000	601,000	16 000	10,000
" afloat	.....	16 000	.....	.....	.....
Toledo	1.044.000	111 000	221,000	128,000	.....
" afloat	.....	.....	.....	.....	.....
Toronto	55,000	.....	45.000	.....	61.000
On Canal	.....	8 000	24 000	.....	18,000
On Lakes	913.000	684 000	490,000	12,000	615 000
On Mississippi	.....	.....	.....	.....	.....
Grand Total	66 834.000	5,227,000	6 134.000	1,555 000	4,475,000
Corresponding date 1894	88,172,000	7 770 000	9,125 000	463,000	3 509,000

MARINE RECORD

ESTABLISHED 1878.

PUBLISHED EVERY THURSDAY AT 144 SUPERIOR ST., (LEADER BUILDING), CLEVELAND, O.

GEO. L. SMITH, IRVING B. SMITH, - - - PROPRIETORS.

WILLIAM L. McCORMICK, - - - EDITOR.

BRANCH OFFICE,

CHICAGO, ILL., - - - - 238 Lake Street.

THOMAS WILLIAMS, Associate Editor.

SUBSCRIPTION.

One copy, one year, postage paid, - - - $2.00.
One copy, one year, to foreign countries, - $3.00.
Invariably in advance.

ADVERTISING.

Rates given on application.

All communications should be addressed to
SMITH & SMITH,
144 Superior Street,
CLEVELAND, O.

Entered at Cleveland Postoffice as Second-Class Mail Matter.

CLEVELAND, O., DECEMBER 19, 1895.

IT is worthy of notice and mention that in nearly every instance where anything has been said about life-saving crews disbanding the men promised, or expressed their intention of resuming service in the spring. This shows the excellent effect upon the service of paying the men wages which make the berth of surfman something better than a last resort. Not only has the grade of men improved where there was margin for improvement in this respect, but the efficiency of the service is very materially increased by the fact of keeping the same trained men in the crews season after season. Never has public money been expended than by the act of the last Congress authorizing this increase in pay.

THE owners are expending, where needed, a fair percentage of their earnings in repairs upon the vessels which brought in the money this season. This shows good business sense but it points a moral in another direction. The Lake Carriers' Association and its component predecessors have been of incalculable benefit to lake commerce in the past, and the association has still an extensive and important work to perform. The daily press has recently contained some very broad statements in regard to the number of owners who, it was alleged, were not members of the Association this year. This number was, it is believed, somewhat exaggerated, but it is certainly true that a number of owners remained outside this year who should have been enrolled. It is to be hoped that these owners will look at this matter this winter in the light set forth in the beginning of this paragraph. and that they will not begrudge the very reasonable dues which return such large benefits.

THE thought is forced upon us in connection with Lieut. Blow's transfer, that a careful and extensive business firm would hardly consider it to its best interests to remove the manager of a branch concern just when he had given this branch a good start, to put him at other work, when the interests of the business demanded that he be retained in his old position. Lieut. Blow's service on the lakes, taken with the able assistance which he has received, have made the hydrographic service what it is on the lakes. Able as his successor may be, it requires time to become conversant with the large mass of detail involved in this work, and with the change from salt water customs and requirements to those of the lakes, and while frequent changes in lines of duty may be necessary to proper discipline it should be remembered that the navy is by no means exclusively a war machine, and that its civil duties are increasing in relative importance every year. Lieut. Blow has seen enough of war service not to get rusty for some time, and the interests of the Hydrographic Office would have been better served by retaining him at his present post of duty.

THE HIGH BRIDGE QUESTION AGAIN ON DECK.

The vessel interests of the lakes are once again confronted with the question of a bridge at Detroit—a question to which the trite simile of Banquo might aptly be applied. Some years have elapsed since the bridge proposition was successfully combatted before Congress through the very successful of the late Hon. George H. Ely, that able champion of water commerce, who has passed from among us, and of Hon. R. C. Parsons, who is not only alive in the literal sense, but also in the sense that he is still in close touch with the vessel interests and is better equipped than ever to lend his very active assistance in showing Congress why the erection of such a bridge as that proposed would work seriously to the detriment of successful lake commerce on its present grand scale, in which the entire North shares the benefit. The bill will also of necessity be considered, by the Dominion Parliament, as the interests of that country are as truly, if not so extensively involved, as our own.

The Lake Carriers' Association, as the representative of all vessel-owning interests, has always taken a decided stand against any bridge project which contemplates the placing of piers in the river, and which does not allow at least 150 feet in the clear above the mean level of the river. The bill just introduced provides that the central span shall leave a clear space of 140 feet above the mean water level of the river, and this middle span is to be only 1,100 feet in length. The river is about 2,400 feet in width at the point where the Michigan Central wishes to construct this bridge, and the supporting piers would stand out from shore about 650 feet, affording two obstructions to navigation, the proportion of danger in which is many times their actual measurements. As stated before, the vessel interests will take a decided stand against the placing of any piers any considerable distance from shore; and they will be able to produce arguments and to cite instances which will show that their opposition is just and reasonable, and savors nothing of obstinacy or dog-in-the-mangerism. The arguments which have been used against low level bridges and winter bridges in times past will weigh with equal force against a bridge project which purports to have eliminated these objections, but which has not really done so.

The current of Detroit River is not a factor to be trifled with, and monster piers in the river will only result in more eccentricities. The piers supporting the high bridge at Cincinnati over the less dangerous Ohio river have been the scene, within a few years past, of two wrecks, both of which involved loss of life, and great loss of property, including absolute destruction to the boats themselves; and these incidents, with a fair resume of some of the exciting experiences in Detroit River, which most of the lake masters will be able to recall, should have great influences in deciding Congressmen to vote against this project when the alternative of a tunnel has been proven by the experience of the Grand Trunk to be feasible and more profitable in the end.

THE MICHIGAN'S SURVEY AT POINT AU PELEE.

There will be published, in the Hydrographic Office Notice to Mariners for the Great Lakes for the month of December, a reduced chart of the vicinity of Point Pelee, including passage which has proven so dangerous to navigators on the lakes the past season. This chart is the result of the survey by the U. S. S. Michigan in August and September last. The size of the regular chart, which will be published in about three months, will be twice the length and twice the breadth of the reduced chart. which is only a photographic reproduction for the purpose of giving advanced information.

It is hoped that, by the opening of navigation next season, the Dominion Government may be prevailed upon to establish an adequate system of buoyage and and lighting for this vicinity.

WILL MAKE A FOURTH ATTEMPT.

Capt. Jay Hursley, of the Hursley Tug Co., has purchased the wrecks of the Moonlight and Kent, ashore on Chocolay Beach, near Marquette, from the underwriters for $7,000. Capt. Hursley made a personal examination before going to Chicago, when he tried for a wrecking contract, but was informed that nothing would be done untill spring. Capt. Hursley does not expect to be forced to use jacks and ways, but says he will go to the wrecks early in the spring, and he feels confident that he can get the boats off by setting three sand pumps to work and placing two tugs to pull on the boats.

THE SEASON OF 1895.

The close has been reached of what has, by reason of natural and commercial conditions, been one of marked prosperty. While in some instances net earnings have been very small, this has been due to what proves to have been poor business foresight. In the spring of 1894, when the depression had continued for eight months, and the outlook was not bright, the ore rate from the head of Lake Superior was fixed at 80c, and while those owners who first closed at this figure were severely criticized, the wild rates through the season marked the course of these owners as the part of wisdom. One year later, when the iron industry was picking up, when ore dealers had already sold ore 25c per ton higher than the previous year, and when the feeling throughout all business circles in and related to the iron industry was most encouraging, contracts for the transportation of ore were closed at 75c per ton, five cents below the contract rate for the previous year, with coal contracts as low as they had been in the year of 1894. Most of the owners kept pretty well clear of contract ore, in the well founded belief that rates would improve. The results are too fresh to warrant extended mention More than ten million tons of ore was carried, much more than has ever before been brought down, and the grain, flour, lumber and coal trade have added their quota to the general prosperity. Instances have been quoted to show that the average profits from vessel capital this year would be not more than 7 per cent; but this must be considered a rather low estimate. A managing owner of a certain fleet said at the opening of the season that if one wooden boat of the fleet earned 6 per cent this season he would be satisfied. The boat was a steamer, with capacity for 18 0 tons on Sault canal draft, or 60,000 bushels of wheat. This boat has run without any special accident; has been well managed throughout the season. She had earned her 6 per cent some months ago, and two 2 per cent. dividends have since beeen declared. Another divide of 2 per cent will be made when the accounts are closed this month. The boat had earned just twice what was expected from her. She is a small boat, and the earnings of the big steel freighters must have been something more, even when the much larger amount of capital invested is considered.

The addition to next year's capacity of the large fleets now under construction and contract at lake ship-yards will, however, have a marked effect on lake freights for 1896, and the contract rate will not be so fancy a figure as might be expected by too sanguine owners. It is safe to say, that if ore dealers offer $1.20 or $1.25 for contract boats for next seasou, plenty will be obtainable, even with indications for largely increased production over the present year. The vessel men are working together better than ever before, however, and shippers must not count on ever again bring able to obtain the demoralizing rates of a few years past.

NOTES.

THE national convention of the National Seamen's Union, which was held at Chicago, elected Daniel J. Robertson, of Chicago, national president; F. H. Burgeson, Boston, national vice-president; and T. J. Elderkin, Chicago, general secretary and treasurer.

and by the entire freedom from vibration.

THOMAS CURTIS CLARKE says in the January Scribner that the recent vote of New York in favor of canal improvement is almost as important to posterity as was the original decision to build the Erie canal. This article will be an eye-opener to most readers of Scribner's in its setting forth of the stupendous magnitude of our internal commerce.

FOR Anthony J. Drexel, of Philadelphia, George L. Watson has designed a steam yacht of 1,250 tons. Her principal dimensions are: 229 feet 6 inches l. w. l. by 33, feet 6 inches in breadth. By the contract she is to attain the speed of 16 knots, and for this purpose she is to have twin-screw engines by Messrs. Rowan, of Glasgow. She is being built at Troon, by the Ailsa Shipbuilding Co., and is now almost through the framing stage. Margarita is to be her name.—The Yachtsman, London.

SHIP BUILDING AND REPAIRS.

TWO LAUNCHES NEXT SATURDAY.

At the yard of the Cleveland Ship Building Co. will be launched, next Saturday at 2:30 p. m. the new steamer for the Wilson Transit Co. She will then be the largest lake vessel afloat, although she will hold this record only until about midwinter. The new Wilson boat will be named in honor of a gentleman of considerable prominence in marine circles, but the name is not ready for the public just yet.

The Detroit Dry-dock Co., have decided to launch the new sidewheel steamer City of Buffalo, building for the Cleveland & Buffalo Transit Co., on next Saturday afternoon, although this is subject to the weather. The weather seems likely to continue soft enough for launching purposes for a day or two, and this programme will doubtless be carried out. The City of Buffalo will be the largest side-wheeler afloat on the lakes, and will be at once towed to Detroit. where the work of putting in her cabins will begin.

GENERAL REPAIR WORK.

The work of looking over and repairing steel vessels before placing them in ordinary still keeps the local dry-docks and ship builders busy. The Masaba has been in the Cleveland dry dock all week, getting bottom damages repaired; eight large plates had to be replaced. The Kearsarge, which has been receiving side repairs at the Cleveland Ship Building Co.'s yard, will take the Masaba's place in the dock to have her bottom looked over.

At the Ship Owners' dry-dock the steamer Mantoa is getting large repairs to her bottom, some 26 or 28 plates being damaged, making a bill of about $5,000. The Marnia received two new plates and has her bottom painted, and the Joliet is now in for two new plates. The two shipbuilding companies divided the work.

CHICAGO.—At Miller Bros.' shipyard the schooner Michigan went into dry-dock on Friday. Captains William Keith and James A. Calbick have made a survey of the damage caused by her going ashore. She is to receive extensive repairs. The work is in progress. The repairs on the steamer John Emory Owen are being rapidly pushed forward by a large force of ship carpenters and calkers. The steamer George Spencer received considerable repairs to her cabin.

At the Chicago Shipbuilding Co.'s shipyard, the steamer Argonaut was in dry-dock for general repairs and recalking bottom. The steel steamer W. H. Gratwick is in dock receiving some new frames and plates. The steamer J. C. Perrett is at the company's derrick receiving a new boiler. She is also to have her upper works re-constructed. General repairs are being done on the steamers Harvey Brown, E. M. Peck, Yale, and McWilliams.

WILLIAMS.

REPAIR NOTES.

The Pathfinder went into Mills' dry-dock, Buffalo, this week, for some repairs and a general overhauling. The Arabia and Juniata were in the Union dry-dock this week.

Leatham & Smith, of Sturgeon Bay, have succeeded in raising the tug Wright, which had been sunk by the ice. She will need considerable repairs this winter.

The owners of the Fountain City will put a "bustle" on the boat this winter.

The McKinnon Iron Works, Ashtabula, will make extensive repairs on the steamer W. R. Stafford's machinery. In addition to other work the cylinders will be bored out and new pistons put in.

The Glidden is having her masts trimmed down into pole spars at Devney's shipyard, Ashtabula.

The steamer Onoko will get extensive repairs to her machinery in Cleveland.

The George Farwell is to be converted into a double-decker at Alex. Anderson's yard, Marine City, this winter.

The John Mitchell was dry-docked at Milwaukee last week for slight repairs.

Devney, of Ashtabula, will do considerable work on the steambarge A. Folsom and schooner Mary B. Mitchell.

THE DETROIT RIVER HIGH BRIDGE BILL.

Senator James McMillan, of Michigan, introduced in the Senate on Monday a bill for a high bridge across Detroit River, which was referred to the committee on Commerce, of which committee Senator McMillan will be a member.

The bill in its present form is to empower the Michigan Central Bridge Co. to construct and maintain a bridge at Detroit, to consist of three spans, the length of the main channel span to be not less than 1,100 feet in clear between the masonry piers, measured at a point 25 feet below extreme low water. There shall be only two piers in the river. The height of the superstructure shall be fixed by the Secretary of War, provided, that the clear head room available for vessels under the span at the mean stage of water, as recorded dnring the season of navigation, shall be not less than 140 feet throughout. The bridge shall be at right angles to and its piers parallel with the current of the river. The Lighthouse Board is to prescribe the lights or signals to be displayed from the bridge at the expense of the owners, whenever the Secretary of War shall decide that the public interests require it. It shall be the duty of the Secretary of War, in case of necessity, to require the bridge company to cause such aids to the passage of the bridge to be constructed and maintained at the cost of the bridge company, in the form of booms, dikes, piers, etc., for the guiding of rafts, tows, steamboats, etc., as shall be specified in his order on their behalf. On failure to do so the Secretary of War may cause the bridge to be removed, or cause the aids to be rebuilt at the expense of the company. It is declared that the proposed act shall be null unless the bridge is commenced within three years from the time the act takes effect and is completed within six years. The act is not to be considered operative in this connection until the consent of the Canadian government shall have been obtained and of effect. The final section of the bill reserves to Congress the right to amend or repeal the proposed act, and the right to require changes in the proposed sturcture or its entire removal at the expense of the owners whenever the Secretary of War shall decide that the public interest requires it.

LAKE CARRIERS' ANNUAL.

The annual meeting of the Lake Carriers' Association will be held at the Russel House, Detroit, beginning Wednesday, January, 15.

MINNESOTA'S VESSEL TAX LAW.

To the Editor of The Marine Record:

I am in receipt of many inquiries from vessel men around the lakes, relative to the provisions of the vessel taxing law, prepared by me, and passed at the last session of the legislature of this state.

For the information of the large number of vessel owners interested in the subject, I herewith inclose a copy of this law, as it was finally passed, and as it now is. The indications are that a large number of vessel owners will take advantage of the low rate of taxation prevailing here, and enroll their vessels at this port.

Yours very truly, HERBERT R. SPENCER.

Duluth, Dec. 17, 1895.

AN ACT REGULATING THE TAXATION OF STEAM VESSELS, BOATS AND OTHER WATER CRAFTS.

To be enacted by the Legislature of the State of Minnesota,

SECTION 1. That the consideration of an annual payment into the state treasury by the owner of any steam vessel, barge, boat or other water craft owned within this state, or hailing for any port thereof, engaged in the navigation of international water, of a sum equal to three cents per net ton of his registered tonnage thereof, such payment shall be received in lieu of all taxes, and said steam vessel, barge, boat or other water craft shall be and the same is hereby made exempt from all further taxation, either state or municipal, upon the payment of the sum herein provided.

SEC. 2. The owner of any steam vessel, barge, boat or other water craft hailing from any part of this state, desiring to comply with the terms of this act shall annually on or before the first day of July file with the State Auditor a verified statement in writing containing the name, port of hail, tonnage and name of owner of such steam vessel, barge, boat or other water craft, and shall thereupon pay in to the state treasury a sum equal to three cents per net ton of the registered tonnage of said vessel, and the treasure shall thereupon issue his receipt therefor.

SEC. 3. The State Treasurer shall annually, on or before the first day of December, pay into the county treasury of any county wherein is located the port of hail of any steam vessel, barge or other water craft complying with this act, one-half of all money so received from any vessel or other water craft where port of hail is within said county.

SEC. 4. This act shall be in force from and after its passage.

WINTER MOORINGS.

Reports of vessels laid up for the winter, in addition to those already published, are as follows:

STEAMERS:

Aztec.....Toledo	Moore, C W...Menominee
Annie Laura.....Chicago	Mineral Rock..Port Huron
Briton.....Ashtabula	McWilliams,J.J. S Chicago
Britannic.....Port Huron	Merida.....Chicago
Brown, H. H....S. Chicago	Mitchell, John....Chicago
Business.....Port Huron	Minch, Philip.....Chicago
City of Toledo.....Toledo	Nipigon.....Toledo
Cross, Belle....Port Huron	Newaygo.....Port Huron
Chamberlin.....Pt. Huron	Owen (tug).....Escanaba
City of Concord..Pt.Huron	Owen, Ira H.....Toledo
Carpenter, O. O..Pt.Huron	Onoko,.....Cleveland
Cleveland.....Pt.Huron	Pawnee.....Port Huron
Colorado.....Pt.Huron	Pastime.....Toledo
City of Collingwood (Br.) .....Collingwood	Panther.....Toledo
City of Midland (Br.) ... .Collingwood	Porter, Lloyd S..Pt Huron
City of Parry Sound (Br.) .....Collingwood	Peck, E. M. ...S. Chicaga
City of London (Br.) .....Collingwood	Penobscot.....Chicago
City of Toronto (Br.).... .....Collingwood	Reynolds, S. C.....Toledo
Corona.....Ashtabula	Rose, D. F.....Toledo
Davis, C. H....Port Huron	Richards, Rube....Buffalo
Desmond (tug).....Toledo	Runnells, H. E.....Detroit
Defiance (Br.).....Lorain	Riverside .....Lorain
Farwell, G H..Marine City	Stafford, W.R ..Ashtabula
Gault, John C.....Toledo	Saginaw.....Toledo
Gould, G. J.....Toledo	Sage, Russell.....Toledo
Groh, Mary....Port Huron	Seattle .....Port Huron
Germania.....Port Huron	Stewart. Rhoda..Pt Huron
Hoyt, Colgate.....Duluth	Smith, Lily (Br)...Sarnia
Hopkins, A. L...Ashtabula	Sawyer, W. H..... Lorain
Hiawatha.....Lorain	Salina.....Marine City
Hurd, J. L..Sturgeon Bay	Trevor, John B ....Duluth
Hart, Eugene ..Green Bay	Thomson, A. D..Ashtabula
Hart, Fannie...Green Bay	Toltec .... Chicago
Hinton, F.....Manitowoc	Tempest No. 2.Port Huron
Hope, George F...Chicago	United Empire (Br.).... .....Sarnia
Ionia. .....Chicago	Vega.....Lorain
Kaliyuga.....Chicago	Volumteer.....Toledo
Lotus .....Escanaba	Vulcan.....Lorain
Loretta.....Toledo	Weed, Emily.....Duluth
Mather, Samuel....Duluth	Worthington, H. L ....Chicago
Monarch (tug)...Escanaba	Wetmore, W. L...Escanbs
Metropolis.....Toledo	Wallace, Robt.....Lorain
	Yuma .....Cleveland
	Yale ....S. Chicago
	Yakima.....Chicago

CONSORTS AND SAIL.

Arthur.....Toledo	Knapp, F. M..Port Huron
Albany .....Toledo	Katahdin (Br.).....Sarnia
Aldrich.....Sturgeon Bay	Keepsake.....Marine City
Alaska.....Port Huron	Mowatt. James.....Duluth
Atmosphere (Br.)...Sarnia	McWilliams, Ed Ashtabula
Arctic (Br.).....Sarnia	Miztec.....To'edo
Azov (Br).....Sarnia	Monguagon .....Toledo
Aurora (Br.).....Sarnia	Massasoit.....Toledo
Barnes, C. C.....Toledo	Melbourne.....Toledo
Boscobel .....Toledo	Maumee Valley....Lorain
Buckeye State.....Toledo	Martin, D. R.....Chicago
Brooklyn.....Toledo	Maud, S.....Port Huron
Bronson, T. J.....Chicago	Montgomery.. Port Huron
Brainard, Kate.Port Huron	Magnet.....Port Huron
Bahama.....Port Huron	Mary Amelia...Port Huron
Bavarian (Br.).....Sarnia	Mitchell, M. B.. Ashtabula
Collins, Mary..... .....Sturgeon Bay	Negaunee .....Toledo
Case, J. I.....Toledo	Onward.....Lorain
Case, William.....Toledo	Orton, Minnie. Port Huron
Corry, Mike.....Toledo	Prussian (Br.).....Sarnia
City of the Straits..... .....Port Huron	Pandora (Br.).....Sarnia
Cahoon, Thomas. ....Port Huron	Quimby, T. L..Port Huron
Cataract (Br.).....Sarnia	Rounds, W. H.....Toledo
Campbell, Fannie (Br.).. .... Sarnia	Richards, J. S.....Toledo
Corsande, (Br).....Sarnia	Rhodes, D. P.....Toledo
Dobbie, Thomas....Toledo	Rice, John.....Toledo
Delaware .....Toledo	Redfern.....Lorain
Darley, K.....Port Huron	Ralston, Levi..Port Huron
Dashing Wave.Port Huron	Robinson, Eva.Port Huron
Edwards.....Port Huron	Racine.....Port Huron
Ely, S. P.....Toledo	Schuette, John.... Toledo
Emerald....Sturgeon Bay	St. Peter..... ....Toledo
Francomb, John A..... .....Ashtabula	Spademan, C.....Toledo
Foster, S. H.....Toledo	Smith & Post.....Lorain
Fontana .....Detroit	Seymore....Sturgeon Bay
Favorite..... .Port Huron	Sweepstakes...Port Huron
Goff, M. R.....Port Huron	Schilde.....Port Huron
Grandy, Wm..Port Huron	Stewart, W.W...Pt Huron
Gleniffer (Br.).....Sarnia	St. Clair (Br.) .....Sarnia
Hammond, L. S....Toledo	Sephie (Br).....Sarnia
Hanscom, Belle. ..Toledo	Southampton (Br),.Sarnia
Hale, D. J.....Port Huron	Tyson, Emma E.Pt.Huron
Judd, E. T.....Toledo	Tuxbury, A. C.....Lorain
Jones, William....Chicago	Three Brothers.....Lorain
Jackson, A....Port Huron	Winslow, Kate..Escanaba
Jupiter .....Sarnia	Warmington, G. H..... .....Escanaba
Irwin, George..Port Huron	Wallace, David.....Lorain
Interlaken.....Port Huron	Watson, S. L.....Lorain
Kelley.....Escanaba	Wells, Hattie..Port Huron
	Wesley, John..Port Huron
	Wesley, George..Pt.Huron
	Wawanosh (Br.)....Sarnia
	Yankee.....Port Huron

ST. MARY'S CANAL TRAFFIC FOR 1895.

The reports of the season's traffic through the American and Canadian canals at St. Mary's Falls are given below. According to the figures thus severally set forth the amount of iron ore passing through the canals was 8,066,635 net or 7,095,210 gross tons, which does not quite give the canals full credit, as the dock statistics of the five Lake Superior shipping ports give a total of shipments of 7,264,527 gross tons.

The aggregate of bituminous coal shipped to Lake Superior was 2,122,704 net tons, as compared with 2,164,314 tons, a decrease of 41,610 tons. When with this decrease is taken into consideration the business revival of the northwest, especially the large increase in railway traffic, which is the largest consumer of coal, it will be seen that predictions of a probable shortage next spring are far from idle. This may enable dealers to obtain better prices next spring, when they will certainly be able to pay a higher average rate of freight.

The total of wheat passing down through the canals was 46,113,186, an amount far in excess of any previous record, and equal to two-thirds of the visible supply in the country. Last year's shipment of wheat was 34,869,483 bushels, but this has been exceeded in previous seasons. Flour shows a slight falling off as compared with last sear, the record being 8,896,497 barrels for 1895, against 8,964,990 barrels for 1894. The higher rates during the fall were responsible for this.

Lumber shipments do not quite correspond with the increase in the cut throughout the Lake Superior district, the total shipment being 742,738,000 feet, an increase of only 20,000 feet over last season. This slight increase was also due to the high rates on ore and grain, which shut off lumber shipments some little time before the close of the season. The report for December of General Superintendent Wheeler states that there were 114 lockages during the eleven days in which the canal was open, during which 189 vessels with a total registered tonnage of 193,143 passed through. The detailed report is as follows:

EAST BOUND.

ITEM.	Dec. 1894.	Dec. 1895.	Season, 1894.	Season, 1895.
Copper, net tons	740	130	99,573	107 147
Corn, bushels	.....	.....	1,530,008	80,859
Building stone, net tons	.....	.....	21,417	23,410
Flour, barrels	226,867	283,050	8,964 990	8,730,895
Iron ore, net tons	4,228	26,077	6 548,876	7 850,065
Iron, pig, net tons	3,484	493	24 552	24 674
Lumber, M	3,860	4,444	722,788	730,253
Silver ore, net tons	.....	.....	412	100
Wheat, bushels	373,6 1	3 264,810	34,869,483	41,573,892
Unclassified freight, net tons	592	106	182,282	130 588
Passengers, number	36	7	13,905	15 135

WEST BOUND.

ITEM.	Dec. 1894.	Dec. 1895.	Season, 1894.	Season, 1895.
Coal, anthracite, net tons	6 400	6,950	532,870	424,627
Coal, bituminous, net tons	.....	14,900	2,264 314	2,001,141
Flour, barrels	.....	.....	783	2 150
Grain, bushels	.....	.....	10 500	35 650
Manufactured iron, net tons	.....	200	36,107	73 663
Salt, barrels	.....	.....	237,461	263,079
Unclassified, net tons	.....	1,500	268,903	289,085
Passengers, number	.....	.....	13 331	15.775
East bound freight, net tons				187,342
West bound freight, " "				23,550
Total " " "				210,892

SEASON'S SUMMARY.

East-bound freight, net tons	11,617,404
West-bound freight, net tons	2,854,244
Total freight, net tons	14,471,648
Total number passengers	30,910
Canal opened opened for traffic	April 25
Canal closed to traffic	December 11
Number days operated	231
Average freight per day, net tons	62,647 83

During the season just ended the freight traffic through St. Mary's canal, including that of the Canadian canal, reached the enormous amount of 15,062,580 net tons. This is an increase of over 14 per cent. or 1,866,720 net tons over that of 1894, when it was nearly 2,000,000 net tons greater than in 1892, the best year in the history of the canal previous to that time. The registered tonnage this year amounts to 16,806,781 tons net, the estimated value of which is $159,695,646.60. As compared with 1894, this is an increase of 28 per cent, or 3,696,415 net tons. The greatest increase, 65 per cent. is in the item of manufactured and pig iron, and the least, 2 per cent, in lumber. The canal was open 231 days this year, 3 days less than last year. Following is a comparative statement of freight and passenger traffic to and from Lake Superior for the season of 1895:

ITEMS.	Designation	SEASON. 1894.	SEASON. 1895	INCREASE. Amount.	INCREASE. Per Cent	DECREASE. Amount.	DECREASE. Per Cent
Vessels [a]	Number	14,491	17,956	3,465	24	.....	.....
Lockages	Number	6,431	7,734	1,303	20	.....	.....
Tonnage, registered	Net tons	13,110,366	16,806,781	3,696,415	28	.....	.....
Tonnage, freight	Net tous	13,195,860	15 062.580	1,866,720	14	.....	.....
Passengers	Number	27,236	31,656	4,420	16	.....	.....
Coal, hard	Net tons	532,870	440,477	.....	.....	92,393	17
Coal, soft	Net tons	2,264,314	2,133,885	.....	.....	130,429	06
Flour	Barrels	8,965,773	8,902,302	.....	.....	63,471	01
Wheat	Bushels	34,869.482	46,218,250	11,348,767	33	.....	.....
Grain other than wheat [c]	Bushels	1,545,008	8,328,994	6,783,686	.....	.....	.....
Manufactured and pig iron	Net tons	60,659	100,337	39,678	65	.....	.....
Salt	Barrels	237,461	269,919	32,458	14	.....	.....
Copper	Net tons	99,573	107,452	7,879	08	.....	.....
Iron ore	Net tons	6,548,876	8,062,209	1,513,333	23	.....	.....
Lumber	M. Ft B. M.	722,788	740,700	17,912	02	.....	.....
Silver ore	Net tons	412	100	312	.....	312	143
Building stone	Net tons	21,417	23,876	2,459	11	.....	.....
Unclassified freight [b]	Net tons	471,185	463,308	12,123	03	.....	.....

NOTE [a].—Steamers, 12,495; sail, 4,790; unregistered, 671. Total, 17,956.
[b].—Included in the item of "unclassified freight" are 2,250 tons of wool and 397 tons of hides.
[c].—The item of "grain, other than wheat," in this season's report, includes such east-bound grain as was heretofore reported in the item of "unclassified freight;" therefore no percentage is given.
[d].—The above comparison includes the traffic through the Canadian canal, which was opened to commerce on September 9 and closed on December 6, 1895—87 days.

THE CANADIAN CANAL.

The Canadian canal was closed for the season on December 6, having been open for traffic 87 days, during which time it afforded great relief to the American canal, practically ending delays to vessels at the Sault. The report in full of Superintendent J. Boyd is as follows:

EAST BOUND.

ITEM.	Dec. '95	Season, '95.
Iron ore, net tons	.....	216 570
Copper, net tons	.....	305
Wheat, bushels	31,100	4 589,294
Other grains, bushels	12.000	722 220
Lumber, ft B M	.....	12,485.141
Iron pig net tons	300	802
Flour, barrels	.....	165.602
Stone, lime, etc., net tons	.....	3 016
Merchandise unclassified, net tons	18	5,611
Passengers, number	.....	1,360

WEST BOUND.

ITEM.	Dec. '95.	Season, '95.
Coal, bituminous, net tons	.....	121 563
Coal, anthracite, net tons	.....	27.810
Iron manufactured, net tons	200	1.713
Salt, barrels	.....	8 918
Coal oil, barrels	1.064	35,320
Merchandise, unclassified, net ton	.....	21 037
Passengers, number	.....	1,169

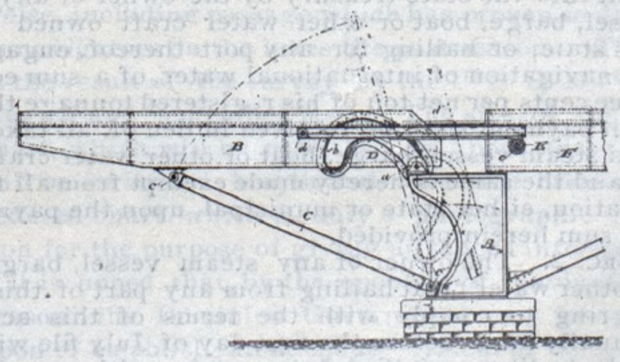
SEASON SUMMARY.

East-bound freight, net tons	419,108
West-bound freight, net tons	182,227
Total freight, net tons	601 335
Total number passengers	2 529
Total number vessels passed	1,168
Total registered tonnage passed	747 371
Canal opened for traffic	September 9
Canal closed	December 6
Number days operated	87
Average freight per day, net tons	6,911 90

MILWAUKEE'S LIFT BRIDGE.

(ILLUSTRATED.)

The RECORD is glad to be able to announce to its readers that Mr. Max G. Schinkle, of Milwaukee has obtained a patent upon the form of bridge invented by him and now in operation at Sixteenth street Mil-



waukee. This bridge was illustrated in the RECORD in its issue of October 31, and the accompanying drawing is a rough outline of the workings of the bridge, as explained at that time. The number of the patent is 551,004, and application was made on March 8 last. The claim is for the combination with a suitable support provided with vertically arranged rollers, of a vertically swinging bridge section provided with longitudinally arranged and vertically curved parallel guides adaped to traverse said rollers, and a brace or links having pivot connections with said bridge and with a suitable fixed support, whereby an assumed point in said moveable bridge section at a distance from its supporting connections is caused to travel in an assumed line in opening and closing the bridge.

IMPROVED TACKLE BLOCKS.

The accompanying engravings show the new style of tackle blocks which the Cleveland Block Company, Cleveland, have brought out.

The points of advantage presented by these blocks are not a few. Besides the side pieces being made of

malleable iron, the hooks, straps and rivets are of open hearth steel. The straps are bored for the pins to run through, making a practically indestructible block, no part wearing except the sheave, which can be easily replaced by means of spring cotters. The blocks on the average are much lighter than those made of wood, and in the hands of the marine trade are not liable to score and crack as wooden blocks will do in time.

TRADE NOTES.

The new steam yacht Anita, built at Baltimore for A. Chauden of New York, has engines built by John W. Sullivan. They are of triple expansion type, with cylinders 16, 24 and 36 inches in diameter and 28 inches stroke. Steam is supplied by three Almy boilers. The engines, when making 230 revolutions, are expected to develop 1,000 horse power and a speed of at least 18 miles. The yacht is 200 feet long over all

The RECORD is in receipt of a handsome calendar from the Buffalo Ship Chandlery and Snpply Co., No. 11-13 Main Street. Captain Alex. Clark is manager of this company. The calendar is decorated with a fine marine view, done in steel.

John Wiley & Sons, publishers of scientific text-books and industrial works, have issued an errata slip for Kent's Mechanical Engineers' Pocket Book, which will be sent free to any address upon application.

The Hogan Boiler Co., of Middletown, N. Y., have issued the third edition of "Truths and Proofs," setting forth in detail the merits of their water-tube boilers, as apposed to some other makes.

The new Clyde Line Steamship Comanche is fitted with American Steamship Windlasses, and Williamson Steam Steerer. The boiler furnaces were furnished by the Continental Iron Works.

The Grand Harbor of the American Association of Masters and Pilots of Steam Vessels will convene Monday, January 20, 1896, at 10 o'clock a. m., in Elks' Hall, southeast corner Ninth and Pennsylvania Avenue Washington, D. C. Quarters have been engaged for representatives at the Ebbit House.

CORRESPONDENCE.

☞We do not hold ourselves responsible in any way for the views or opinions expressed by our correspondents. It is our desire that all sides of any question affecting the interests or welfare of the lake marine should be fairly represented in THE MARINE RECORD.

DANGER POINTS IN HAY-LAKE CHANNEL.

To the Editor of The Marine Record:

The Hydrographic Office in No. 9 of its "Notices to Mariners" publishes a chart of the new Hay Lake Channel, St. Mary's river, Mich., from surveys to 1894 by the Corps of Engineers, U. S. Army. From this chart we learn that the absence of rounding out curves at the intersecting points of courses is a peculiar feature of the new Hay Lake channel. Having a width of 300 feet and a depth of 20 feet, being intended for large vessels passing both ways, constituting a double track, the channel affords at some turning points only room enough for a single vessel of 3,000 tons burden to pass, because rounding out curves at these points are wanting.

If half the width of the channel is occupied by vessels running in one direction, and the other half by vessels in the opposite direction, the midline of each half may be considered the center of each track; thus the distance of the two tracks from center to center is 150 feet, with a margin of 75 feet on each side.

Experiments with the Normandie, the Williamette, the Pennsylvania, and other vessels of 3,000 tons burden have established the fact that the smallest circle which vessels of that class can run has a diameter of 4,000 feet. Therefore a vessel, at the usual rate of speed, cannot round a corner in a curve less than 2,000 feet radius.

At the turning point of the cut in lower Hay Lake, immediately above the dike at Middle Neebish, the change of courses is 39 degrees or 3½ points. The greatest width of the cut, measured radially, is 318 feet. Therefore, a curve of 2,000 feet radius, starting in the midchannel, will pass 122 feet inside the intersection point. As this point for midchannel is 159 feet from the inner corner, the curve passes 37 feet from the inner corner of the cut. From which it is plain, that vessels of 40 feet beam, keeping in midchannel before rounding the corner, will have as close a shave as 17 feet from the inner corner. Consequently, vessels on the inside track, 75 feet from midchannel, cannot pass the corner at all as long as the outside track is occupied by vessels standing down the channel, which, under most favorable circumstances, pass at a distance of only 92 feet from the inner corner, a space far two narrow to run 3,000 ton vessels through in a sharp curve without the risk of colliding. To ensure at this point uninterrupted passage of vessels both ways, the channel has to be widened at the inner corner at least 122 feet.

Similar defects are found at both channel entrances. At the lower entrance or intersection of the cut with Harwood Point range, buoy No. 3, marking the inner edge of the channel, is right in the track of a 2,000-foot curve connecting both ranges. Therefore, at this point the inner edge of the channel ought to be its center. Here vessels standing down the channel have the inside track on the south side of the channel, but cannot round the corner and get clear of buoy No. 3 without running the risk of crossing the track of vessels standing up the river on Harwood Point range, and therefore have to take the north side of the channel before rounding the corner; thus vessels standing up the channel on a straight course for the dike at Middle Neebish are crowded against Sugar Island out of the fairway marked by buoys. To make this passage easy for vessels both ways the channel entrance must be widened at the inner edge, buoy No. 3, 150 feet. The change of courses at this point is 64 degrees or 5¾ points, of itself sufficient reason to have the entrance as wide as possible.

The upper or north entrance of the channel would be more easy of access, and vessels be more safe in the approach thereto, if the flashing white light had been placed 600 feet further inside the cut, so as to enable vessels when through the entrance curve to pass Bayfield Rock buoy, on a straight course to St. Mary's Falls canal, at a distance of 450 feet, instead of 150 feet.

The change of courses at this entrance is 50 degrees or 4½ points. Under existing conditions vessels, in order to get in and out of the channel, will be crowded against Bayfield Rock—a permanent danger, which could have been lessened materially, and seemingly without any additional cost, by giving the flashing light a more southerly position.

Although our lake ship masters excel in the art of handling vessels in narrow cuts and crowded thoroughfares, it is no reason that in the construction of channels first principles in navigation and engineering should be ignored. JOHN MAURICE.

Chicago, December 16, 1895.

LAKE LEVELS.

To the Editor of The Marine Record:

Now that the project of placing wing or other suitable dams at several different points on the lakes is being discussed, it may be of interest to some of your readers to have an idea as to the average height above sea level of the following bodies of water, from which they can figure out the height of each body of water as compared with that into which it empties.

Lake Superior,	601.78	above sea level
Lake Michigan,	581.28	" "
Lake Huron,	581.28	" "
Lake St. Clair,	575.26	" "
Lake Erie,	572.86	" "
Lake Ontario,	246.61	" "

As will be seen, the difference in the height above sea level between Lakes St. Clair and Erie is about 2.3 feet, while the height above sea level of Lakes Michigan and Huron are indentical.

The Sault Rapids, or the fall there, together with the drop of Niagara Falls, accounts largely for the difference of over 355 feet in the height of Lake Superior above that of Lake Ontario. It will be readily seen from the lake levels cited that with one or more wing dams at the outlet of Lake Erie the levels of that lake and of Lake St. Clair can be easily equalized.

To go into the probable effects which this raising of lake levels would produce as to submerging lake shore property, or that in and about harbors would seem to be a gigantic undertaking. But as this is an age of gigantic achievements, the ways and means to get at the probable results, as well as the cost and feasibility of raising certain lake levels, would undoubtedly be provided by the National Government, if the shipping interests push the matter before Congress as unitedly and as strongly as they should do.

The lake levels cited were determined about twenty years ago. If subsequent observations to June 30, 1896, were taken into consideration, it might slightly change these figures. The whole subject of lake levels and the possibility of damming at least at the outlet to Lake Erie to advantage is one I have taken much interest in for many months, and the late Hon. O. M. Poe, who was a warm personal friend of mine, in several conversations gave me much to think of on this subject. Mr. C. E. Kremer, of Chicago, in conversation with me several months since, seemed to be very appreciative of the possible benefits to be derived from, and the expenses now incurred for dredging at various points that would obviated by the proposed raising of lake levels. HARVEY C. BEESON.

Chicago, Dec. 17, 1895.

A TOO COMMON OCCURRENCE.

To the Editor of The Marine Record:

Dear Sir:—The enclosed is a clipping from one of our local papers. I have sent the same to you to give you an idea of how our Marine News is hashed before it is handed to us to read. How can anyone blame us for not knowing which end of the boat is called the bow?

Forever yours,

Houghton, Dec. 12, 1895. A RED-WATER SAILOR.

News from L'Anse is to the effect that the wrecking tug Campbell was lost in the severe storm of last Saturday morning 20 miles from Huron Bay. The Campbell belonging to the Inman Tug line of Duluth and with two other tugs of the fleet, the W. B. Castle and Corono, had been unsuccessfully working on the stranded schooners Moonlight and Kent, which were driven on Chocolay beach during the high gale of the latter part of September. Shortly after midnight Friday night the fleet left for Duluth. The Moonlight and Kent were larger than the Campbell and traveled faster and were able to make Skanee, but the Campbell was lost with all on board, as follows: Capt. Wm. McGibray, mate John Lloyd, first engineer, Geo. McLord, second engineer Fred England, also two firemen and a cook.

BOULDER IN THE LIVINGSTON'S BOTTOM.

A VERY ROCKY BOTTOM.

(ILLUSTRATED.)

This illustration is reproduced from a photograph of a portion of the bottom of the composite steamer Livingston, taken while she was in the Detroit dry-dock. The Livingston struck above Sand Beach, and was brought up standing. She effected her own release, and continued her trip to Buffalo without showing any material leak. She ran aground there on account of low water, but finally discharged her grain cargo and returned light to Detroit. She was placed in dry-dock, when this large rock was found imbedded in the bottom planking. "She was in the dock only three days," writes Secretary G. N. McMillan, of the Detroit Dry-Dock Co., in reply to an inquiry from the RECORD, "and the repairs were made at very small expense, as the damage was confined entirely to her planking. Had the Livingston been a steel steamer the expense to make the necessary repairs would have been very large. This illustrated, to our satisfaction, at least, that the composite steamers, or steel steamers with bottom sheathing, have better protection in time of trouble than the straight steel steamers. The boulder is at present in our yard, where we have kept it as a curiosity."

NEW BLAST FURNACES.

A new branch of the iron ore trade is likely to develop next spring. A large new iron and steel plant is nearing completion at Hamilton, Ont., been in it having course of erection for about three years. The plant will be up to date in all respects, with modern furnaces, machinery and appliances, with fine railway and water terminal facilities, and capable of producing 3,000 tons of cast iron pig per month. The blast furnace ovens, gas-fired steam boilers, forced blast engine, steam hoists, and handling tackle are all of the latest designs. About 108,000 tons of ore, 45,000 tons of coal and coke, and 11,000 tons of limestone will be required next season, and most of it will be received by lake. The company has its own locomotives for moving the material about the plant, and for making up trains for shipment.

A very large proportion of the ore, it is said, will be mined in Canada; at the same time it will be necessary to import a considerable quantity to get the proper grades of iron. These works stand nearly in the center of the iron consuming district of Canada, and the company claims to be able to supply iron with greater advantage to the consumer than any of its competitors on that side of the lakes.

Those capable of judging of the financial prospects of the venture, says the Canadian Engineer, are confident that if the present Canadian laws dealing with the importation and manufacture of iron in Canada remain as they are at present, there can be no doubt of the work being fairly profitable. It is expected that $60,000 worth of iron will be produced monthly when the works are in full operation.

THE great British shipbuilding strike has been settled. The masters agreed to grant the Clyde men a shilling a week advance, with another shilling advance in February. The men in Belfast will also get a shilling advance in February.

NEWS AROUND THE LAKES.

CHICAGO.

Special Correspondence to The Marine Record.

The officers and crews of the large fleet which go into winter quarters at this port are making all the haste possible to get their work of laying up through with, so as to get to their respective homes to spend the holidays with their wives and families and sweethearts.

The steamer Westcott, Capt. A. E. Johnson, arrived at South Chicago Monday morning with a cargo of pig-iron from Fruitport, Mich. On the arrival of the Westcott at Grand Haven Capt. Johnson found that Spring Lake was frozen up with ice 6 inches thick. He employed two tugs one to steer the steamer on either bow while she proceeded up the lake stern first, working her wheel and making a way through the ice. It took her from 8 a. m. to to 5 p. m. Saturday to reach the dock at Fruitport where she loaded her cargo.

The steamer Annie Laura, Capt. W. E. Hudson, arrived with lumber from Ludington Saturday December 13. She is the last of the Chicago fleet of lumber steamers to arrive this season. She will go into winter quarters as soon as she is unloaded.

The steamer Francis Hinton, Capt. Dan'l. Wall, left here Friday morning last for Manitowoc, to go into winter quarters there.

The steamers Ionia, Yakima, Merida, Penobscot, George T. Hope and John Mitchell have arrived here light from Milwaukee during the past week. The Phillip Minch and Kaliyuga are also expected from Milwaukee. They all come here for grain winter storage.

The steamer Charles Rietz, owned by the North Branch Lumber Co., Chicago, bound to this port with lumber from Ludington, went ashore Tuesday night December 10, about 5 miles south of Pentwater. Distress signals from the steamer at 2 o'clock Wednesday morning were responded to by the life-saving crew, who, although out of commission for the season, promptly got together and manned their surf boat and went to the steamer and rescued her crew of 13 men, and took them to Pentwater. The rudder of the steamer was gone and she was pounding badly. A wrecking expedition went from Manistee and released the Rietz and towed her to that port.

At a meeting of Chicago Lodge No. 3, of the Shipmasters' Association, held at their hall Wednesday afternoon, the following officers were elected: Capt. H. F. Loftus, president; Capt. C. H. Hubbard, first vice-president; Capt. L. B. Coates, second vice-president; Capt. William Turner, treasurer; Capt. F. B. Higgie, secretary.

Capt. Edward Mullen arrived here last week from his schooner Commerce, which went ashore about four miles west of Scott's Point, Lake Michigan, on September 22 in a heavy gale. Capt. Mullen has spent nearly $4,000 trying to release her, but bad weather and other adverse circumstances have prevented him. He says the schooner is in good shape, but leaking some. He is very sanguine of getting her released next spring.

WILLIAMS.

FLOTSAM AND JETSAM.

Ashtabula's coal shipments for the season reached about 880,000 tons.

The U. S. trout hatchery at Northville, Mich., now has 13,000,000 eggs, nearly 4,00,000 more than were handled last year.

The government will put in 600 feet of revetment piles at Conneaut, beginning at the land end of the new east pier, for its protection during the winter.

The Pennsylvania and Ohio coal dock at Duluth caught fire this week, but the blaze was extinguished before any very extensive damage had been wrought.

The Kendall Marine Reporting Agency, of Port Huron, has the thanks of THE RECORD for a complete list of vessels in ordinary at the head of St. Clair River.

Owing to the unusually low water in Detroit River a good many parent whitefish secured for the Dominion hatching pound at Sandwich, Ont., have been lost; but despite this accident the number of eggs taken is phenomenal, numbering nearly 100,000,000.

Mr. J. Carson, of Kalamazoo, Mich., has invented and applied for a patent on a wreck locating device, which consists of a ball, attached to a long line, and setting in a pocket. It is very similar to a device already in use, the ball in this instance being glued to the top of the mast by a preparation which dissolves when immersed in the water.

General Passenger Agent A. A. Schantz, of the Detroit & Cleveland line, was presented last Wednesday evening with a handsome leather chair by sixteen employes of the passenger department, who formed themselves into a surprise party and took possession of his house.

Capt. J. V. Tuttle says that while 26 men, two tugs, two lighters and two diving outfits were at Isle Royal 27 days, they were permitted by the weather to work at raising the Centurion's jettisoned copper only 40 hours of that time. They recovered 154½ tons, worth $38,000, and landed it at Port Arthur. The balance, worth $70,000, is on a hard bottom and can be recovered next spring.

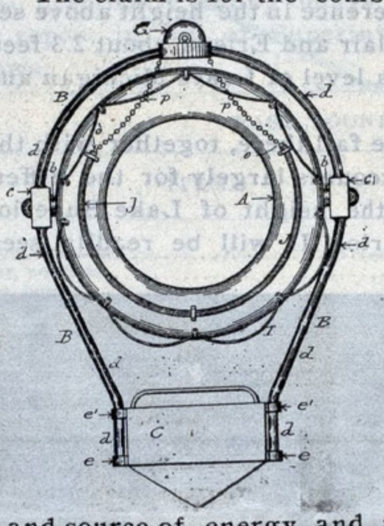
NEW INVENTIONS.

(ILLUSTRATED.)

Following is a list of patents that have been recently awarded on inventions bearing on navigation, marine trade and relative matters:

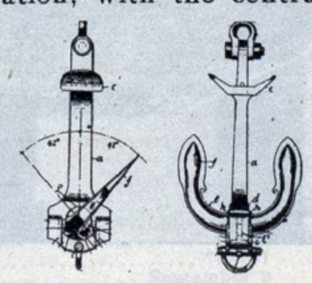
No 551,081. Marine Life-Saving Apparatus. James A. Guest, Washington, and James H. Bates, Hoboken, N. J. Filed August 8, 1894; renewed October 5, 1895.

The claim is for the combination, in a buoy or like structure, of a rigid and continuous main frame and a float journaled or pivoted in said frame, and adapted to be thrown into plane therewith, for convenience of storage, and to move out of plane there with to rest properly upon the water and support the frame; an electric lamp and a source of electric energy carried by the buoy, and a switch included in circuit with the lamp and source of energy, and adapted to be closed by the relative movements of frame and float.



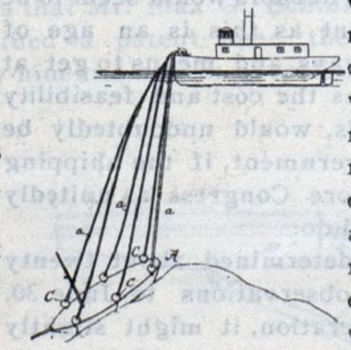
No. 551,125. Anchor. George H. Langley and William T. Honess, London, Eng. Filed June 28, 1895. Patented in England.

The claim is for the combination, with the central point of two arms of an anchor, a pair of angular projections side by side, with a space between them, the abutments forming part of the surface of the shank eye, adapted to limit the motions of the said pair of projections in either direction about their axis, and means extending into said space to hold the place projections in within the eye.



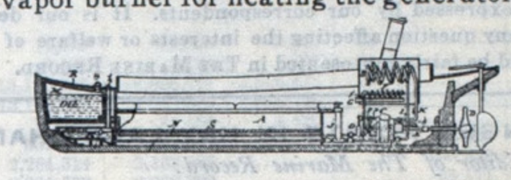
No. 551,329. Means for Raising Sunken Vessels. George H. Chappell, New York. Filed Nov. 29, 1893.

The apparatus comprises a hollow cylindrical float adapted to contain either air or water, and provided with independent and automatically operative inlet and outlet valves, and provided also with a pipe through which air may be forced, having connection with the float independent of the said inlet and outlet valves; also of the combination of a number of these hollow cylindrical floats, a single air chamber to which said floats are independently connected, separate exhaust and supply pipes connecting with said chamber, a suit able check valve and a relief cock in each pipe.



No. 551,226. Apparatus for Operating Vapor Launches. Frank W. Ofeldt, of Jersey City, N. J., assignor to the Marine Vapor Engine Co., of Jersey City. Filed April 20, 1894.

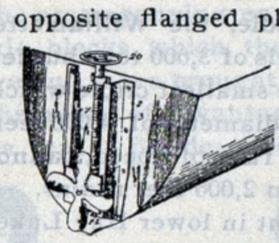
The claim is for the combination, in a vapor launch, a vapor generator, a volatile liquid tank, closed circulating supply and return circuits between the tank and the generator, an engine receiving vapor from the generator, a condenser between the exhaust of the engine and the tank, and arranged upon the outside of the launch, a pump arranged in the supply circuit between the tank and the generator, operated by the engine, to supply volatile fluid to the generator, a propeller operated by the engine for moving the launch through the water and thereby presenting the condenser to fresh bodies of cold water, a vapor burner for heating the generator, entirely



independent of said generator, an oil tank, a pipe leading from said oil tank to the vapor burner, power devices operated by the engine for actuating the pump in one direction to draw the oil from the oil tank, and in the other direction for forcing the oil into the vapor burner under uniform pressure, whereby the pressure under which the vapor of the burner is generated may be less than the pressure of the vapor in the generator, and the heat produced be under the control of devices entirely independent of the pressure in the generator. The tanks are contained in a compartment at the bow of the boat, the tank which contains the volatile fluid being practically beneath the surface of the water, and protected by the upper tank, containing the oil, from the heat of the sun's rays.

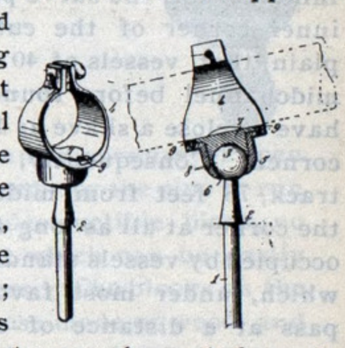
No. 550,983. Boat Propelling Attachment. Albert H. Loebs, Rochester, N. Y. Filed May 28, 1895.

The claim is for the combination of a guide having opposite flanged plates, a guide-block grooved at its sides to engage said flanged plates, an adjusting screw mounted in a fixed bearing and mounted in an opening in said guide block, and headed to prevent axial movement, a propeller shaft mounted for longitudinal movement in its bearings and provided with a stud for detachably engaging a socket in the hub of the propeller wheel, and means for moving the shaft longitudinally and locking it in its adjusted position.



No. 551,265. Oarlock. William E. DeRiar, Stryker, O. Filed October 5, 1895.

This oarlock consists of a shank adapted to be converted into a boat gunwale and formed at its upper end into a ball, the holes formed at their lower meeting points into a half socket adapted toreceive the ball therein, and a retaining plate removably secured to the upper part of said half socket, and adapted to form the upper half of the ball socket; also of two resilient tholes movably connected to the boat gunwale and formed at their upper ends into apertured lugs, in combination with a thmmb-screw adapted to pass through the apertures in said lugs to bring the parts together.



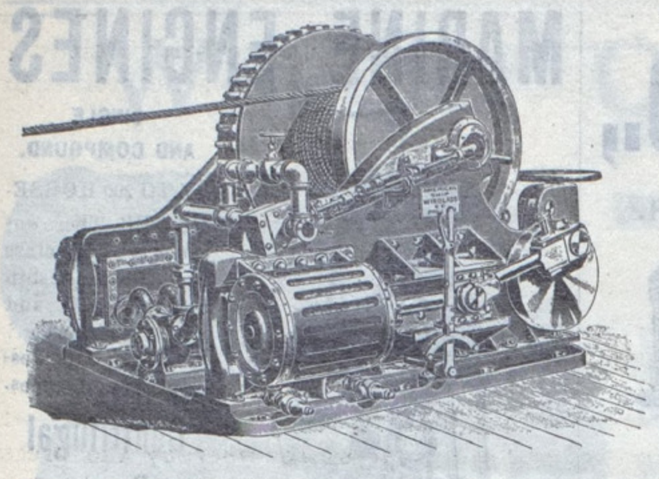
LITERARY NOTICES.

J. M. Barrie was four years writing the serial "Sentimental Tommy," which is begun in the January Scribner. The scene of the tale moves from the East End of London to Thrums. Robert Blum's cartoon, recently placed on the walls of the Mendelssohn Glee Club auditorium in New York, is thought by many critics to be the finest decorative painting in America. It is illustrated and described in the January Scribner.

A new biography of George Washington, by Professor Woodrow Wilson, of Princeton, will be a feature of Harper's Magazine during 1896. The first paper, which appears in the January number, treats of the conditions of the colonies, with especial reference to Virginia at the time Washington's birth. The paper is fully illustrated with the earliest known portrait of Washington, five drawings by Howard Pyle, and other pictures. The entire edition of the December number of Harpers Magazine—an edition of unusual size—was exhausted immediately after publication. A second edition is now coming from tne press.

The Floating Bethel Society, of Cleveland, is now completely out of debt, and the chapel and mission house on River street, near the foot of St. Clair street, will be dedicated Sunday afternoon. Some of the leading clergymen of the city, who have known Chaplain J. D. Jones throughout his twenty-eight years of mission work, will assist in the exercises.

ENGLISH shipbuilders launched 21 vessels in November, as compared with 19 during the previous month.



ESTABLISHED 1857. • • • •

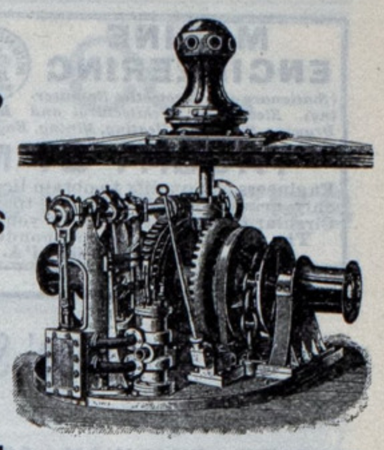
American Ship Windlass Co.,

PROVIDENCE, R. I.

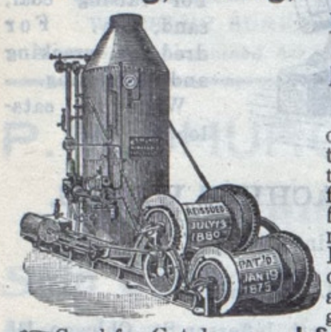
BUILDERS OF THE BEST WINDLASSES AND CAPSTANS IN THE WORLD.

STEAM TOWING MACHINES,
GYPSEY WINDLASSES, BABBITT'S PATENT ANCHORS, ETC.

Address FRANK S. MANTON, Agent.



Hoisting, Mining, Bridge Erecting,

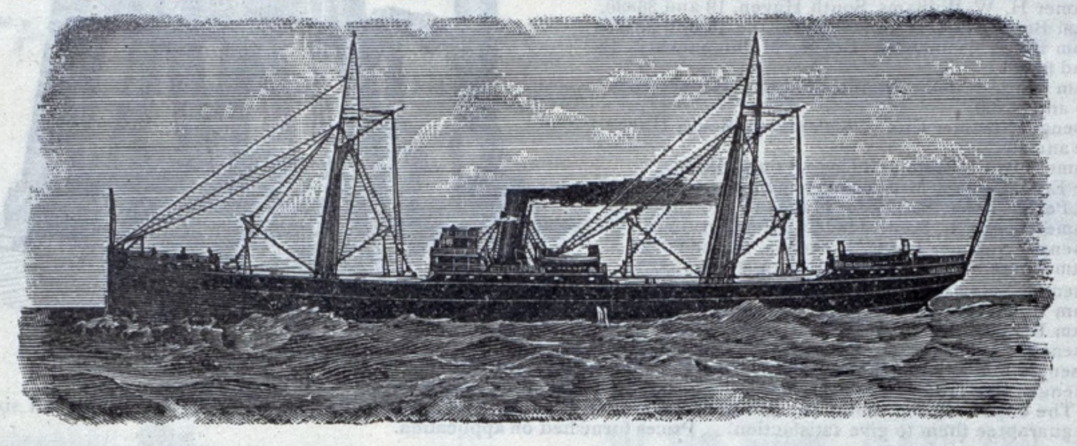


Dock Build'g, Pile Driving, Coal Hoisting and Quarry Engines

of any power, sugar cane transferring engines, transferring machines for depositing cane from car to carrier, with my improved Patent Friction Drums, with or without Boilers. Any amount of reference given. Established 1870.

☞ Send for Catalogue. J. S. MUNDY, Newark, N. J.
1741 Market St., Philadelphia, Pa.
22 Light St., Baltimore, Md.
117 Water St., Pittsburgh, Pa.
249 South Jefferson St., Chicago, Ill.
715 North Second St., St. Louis, Mo.
39 Magazine St., New Orleans, La.
34 Fremont St., San Francisco, Cal.
85 Front St., Portland, Oregon.
Fourth & Wakouta Sts., St. Paul, Minn.
218 Congress St., Boston, Mass.

F. W. WHEELER & COMPANY.,



BUILDERS OF ALL KINDS OF

IRON, STEEL AND WOODEN SHIPS,

FOR LAKE OR OCEAN SERVICE.

West Bay City, Mich.

F. W. WHEELER, Prest. E. T. CARRINGTON, V.-Prest
C. W. STIVER, Secretary & Treasurer.

FRONTIER IRON WORKS,

MARINE ENGINES,

DETROIT, MICH.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, PAID UP IN CASH, - $3,000,000.00.
ASSETS, - - - - 9,562,599.92.

CHARLES PLATT, President. WILLIAM A. PLATT, Vice President.
EUGENE L. ELLISON, 2d Vice President. GREVILLE E. FRYER, Sec'y and Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department. GEORGE L. McCURDY, MANAGER, CHICAGO, ILL.

MARINE AND INLAND INSURANCE.

Atlantic Mutual Insurance Co.,

Organized 1842. Office 51 Wall Street, NEW YORK.

Insures against Marine and Inland Transportation Risks and Issues Policies making Loss Payable in England.

Assets over $10,000,000 for the Security or its Policies.

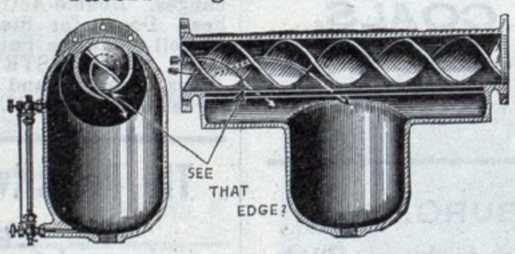
The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.

J. D. JONES, Pres. W. H. H. MOORE, Vice Pres. A. A. RAVEN, 2d Vice Pres. J. H. CHAPMAN, Sec.

FREE

To Engineers and Steam Users, my TREATISE ON THE STEAM SEPARATOR. It tells all about Separators in general and the MOSHER in particular.

You Need It



Send For It

THE INFORMATION IT CONTAINS WILL BE VALUABLE TO YOU.

CHARLES D. MOSHER, - - No. 1 Broadway, New York.

Marine Iron Works,

Clybourn & Southport Aves.,

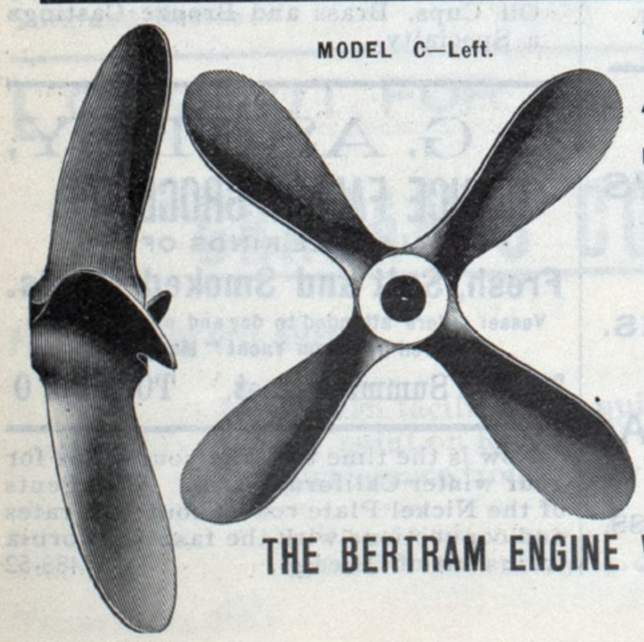
CHICAGO.

BUILDERS OF

STEAM YACHTS,
MARINE ENGINES,
MARINE BOILERS.

Write for List of Boats for Sale.

MODEL C—Left.

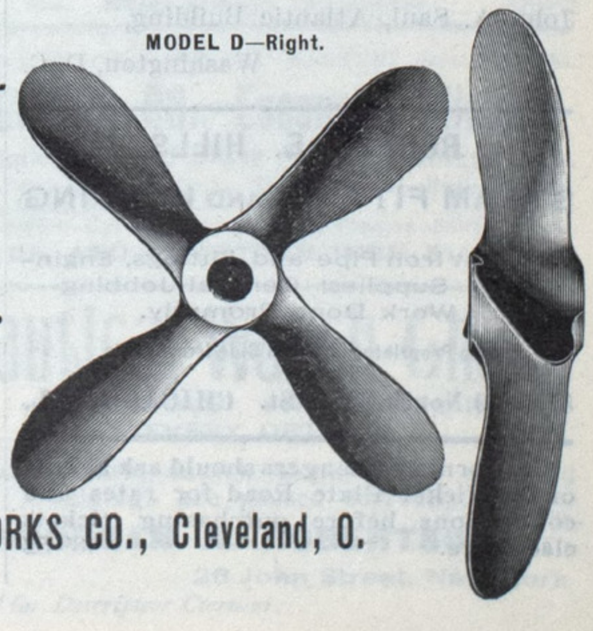


THE CASE OUTWARD THRUST PROPELLER WHEELS.

MODEL A, MODEL B, MODEL C, MODEL D, MODEL E.

The Speediest, Smoothest Running and Most Economical Wheels Yet Made.

MODEL D—Right.



MANUFACTURED BY A. WELLS CASE, Patentee, Highland Park, Conn.

THE BERTRAM ENGINE WORKS CO., Toronto, Ont.
THE GLOBE IRON WORKS CO., Cleveland, O.
S. F. HODGE & CO., Detroit, Mich.

MARINE ENGINEERING

(Stationary and Locomotive Engineering), Electricity, Architectural and Mechanical Drawing, Plumbing, Heating, Mining, English Branches, etc.

TAUGHT BY MAIL.

Engineers can qualify to obtain licenses. To enroll only necessary to know how to read and write. Circular **free.** State subject you wish to study.

The International Correspondence Schools, SCRANTON, PA.

Walter H. Oades' Shipyard,

MARINE RAILWAY AND SHEERS,

Ship Carpenters, Calkers & Joiners.

Working on reasonable terms.

Yard: Foot of Dubois Street, DETROIT.

Telephone 1670, 3 rings.

ABRAM SMITH. ANGUS H. SMITH.

ABRAM SMITH & SON,

SHIP-BUILDERS,

ALGONAC, MICH.

Wooden Ships of any description built, rebuilt, or repaired.

Send for specifications, prices, etc.

Good slips for laying up boats.

A. J. MORSE & SON.

DIVING APPARATUS

140 CONGRESS ST. BOSTON.

A. GILMORE & SONS

TOLEDO DRY DOCK.

Telephone No. 157, TOLEDO, OHIO.

Vessels Docked and Repaired at Reasonable Rates.

PATENTS, CAVEATS, TRADE-MARKS, DESIGN PATENTS COPYRIGHTS, Etc.

CORRESPONDENCE SOLICITED.

John A. Saul, Atlantic Building, Washington, D. C.

ROBERT E. HILLS,

STEAM FITTING AND HEATING

Wrought Iron Pipe and Fittings, Engineers' Supplies; General Jobbing Work Done Promptly.

Also Proprietor of North Side Iron Works.

57 & 59 North Wells St. CHICAGO, ILL.

California passengers should ask agents of the Nickel Plate Road for rates and connections before purchasing tickets elsewhere. 489-52

ESTABLISHED 1871. INCORPORATED 1893.

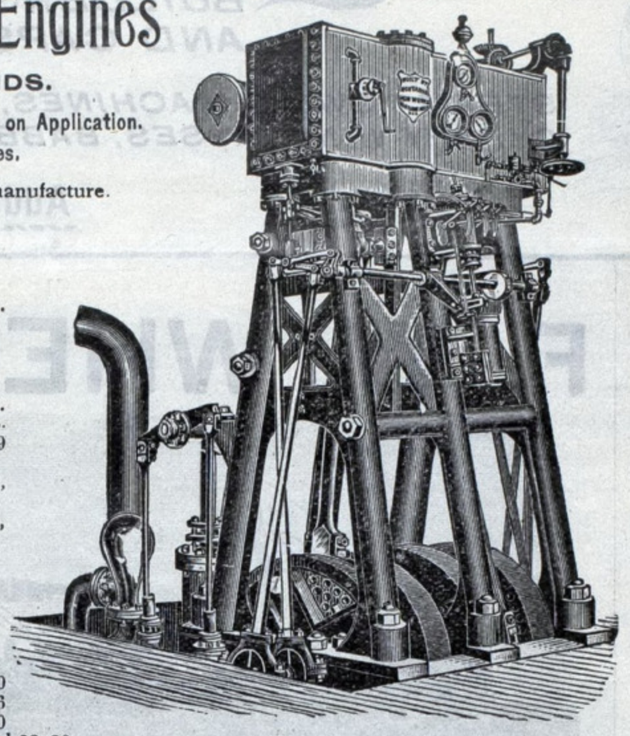
MONTAGUE IRON WORKS CO.,

MANUFACTURERS OF

Marine and Stationary Engines

AND BOILERS OF ALL KINDS.

MONTAGUE, MICH.



Heavy Castings a Specialty. Prices Quoted on Application.

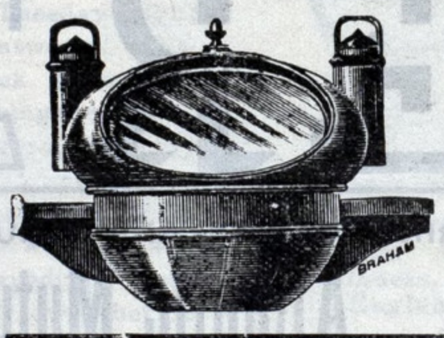
Fore and Aft Compound Marine Engines.

The Engines in the following boats are of our manufacture.

Tug, Hunter, Chicago, 15 and 28x22.
Tug, Tacoma, Chicago, 16 and 30x24.
Tug, Zenith, Duluth, 18 and 36x30.
Steamer Glenn, South Haven, 14 and 28x20.
U. S Survey Steamer, W. S. Hancock 12 and 21x20.
Steamer Pine Lake, Charlevoix, 16 and 30x24.
Passenger Steamer Pilgrim, St. Clair, 14 and 28x20.
Steam Barge Iona, Grand Haven, 24 and 46x42.
Steam Barge M. T. Greene, Chicago, 20 and 36x36.
Steamer H. W. Williams, South Haven, 18 and 36x30.
Steam Barge Mark B. Covell, Manistee, 18 and 30x26.
Steam Barge Isabella J. Boyce, Michigan City, 19 and 32x26.
Steam Barge Luella H. Worthington, Cedar River, 19 and 36x30.
Passenger Steamer City of Kalamazoo, South Haven, 20 and 40x30.
Steamer Oval Agitator, Chicago, 14 and 28x20.
Tug E. G. Crosby, Muskegon, 16 and 30x24.
Tug Peter Coates, Sault Ste. Marie, 10 and 20x16
Steamer Lorain L, South Haven, 12 and 21x16.
Passenger Steamer Lotus, Escanaba, 16 and 30x24.
Steam Barge Sachem, Grand Haven, 21 and 38x36.
Passenger Steamer Bon Ami, Saugatuck, 14 and 28x20
Steam Barge Charles A. Street, Chicago, 20 and 36x36
Steam Barge Edward Buckley, Manistee, 18 and 36x30
Passenger Steamer E. G. Maxwell Pentwater, 14 and 28x20.
Passenger and Freight Steamer Bon Voyage, Saugatuck, 16 and 30x26.
Passenger and Freight Steamer Mabel Bradshaw, Muskegon, 16 and 28x26.

The engraving represents our 20 and 36x36 Fore and Aft Compound Marine Engine. We build them all sizes and guarantee them to give satisfaction. Prices furnished on application.

MONTAGUE IRON WORKS CO., Montague, Mich.



FRANK MORRISON, COMPASS ADJUSTER

AND MANUFACTURER OF

NAUTICAL INSTRUMENTS.

COMPASSES. BAROMETERS, PATENT LOGS, BINNACLES, STEAM GAUGES, MARINE GLASSES, ENGINE INDICATORS.

All Nautical Instruments Carefully Repaired.

Office with Upson, Walton & Co., 161 River St., Cleveland, O.

THE CUDDY-MULLEN COAL COMPANY

DEALERS IN COAL.

Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.

All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick, and One Hundred Two and One-Half Ton Buckets.

Main Office, 81 Perkins Building, East Side of Main Street Bridge.

Dock Office, 127 West River St., Cleveland, Ohio. Telephone No. 8.

Boats Coaled Day and Night. Docks at Amherstburg and Sandwich, Ontario

---

MULLEN-GATFIELD COAL CO.,

Dealers in the Celebrated

MANSFIELD AND YOUGHIOGHENY COALS.

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling. Elevated docks and derrick at AMHERSTBURG, ONTARIO.

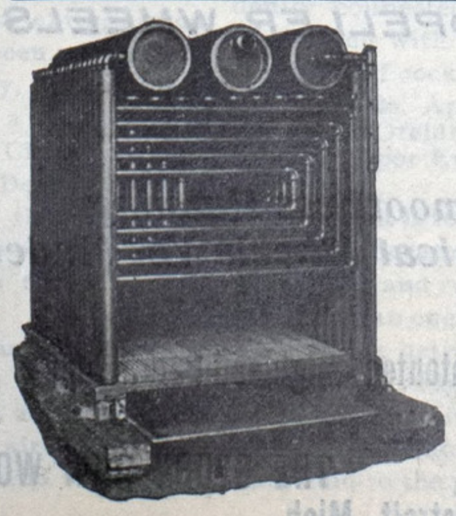
O. W. SHIPMAN DOCKS.

AMHERSTBURG, ONT.

Four Chutes and Low Dock.

Massillon and Youghiogheny **KOAL** Hocking . . .

Main Office, 90 Griswold St., DETROIT.



TREGURTHA SAFETY WATER-TUBE BOILERS

Single, Compound and Triple Expansion Engines.

STEAM YACHTS AND LAUNCHES.

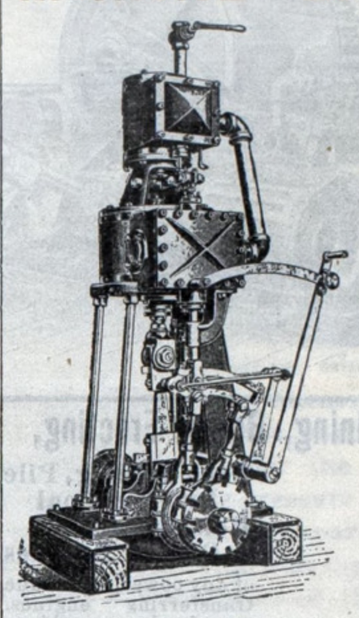
New and Second-Hand Launches in Stock.

MURRAY & TREGURTHA,

West First Street, foot of F Street, SOUTH BOSTON, MASS.

Send three 2c. stamps for Catalogue.

MARINE ENGINES



SINGLE AND COMPOUND.

5 TO 200 HORSE-POWER. These engines are high-class in workmanship and material and moderate in price.

Send for cuts, description and prices.

Centrifugal Pumps

For raising coal, sand, &c. For dredging, wrecking and circulating.

Write for catalogue.

MORRIS MACHINE WORKS,

Baldwinsville, N. Y.

HENION & HUBBELL, Agents,

61-69 North Jefferson St., Chicago, Ill.

Baker's Quadruple Grip Anchor

PATENTED.

AGENTS WANTED.

Watertown Brass & Mfg. Co.,

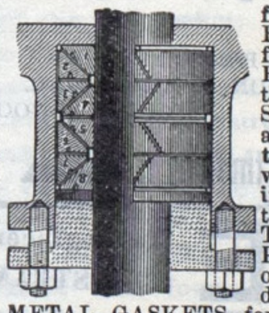
WATERTOWN, N. Y.

Send Stamp for Catalogue.

Mfrs. Yacht, Boat and Canoe Hardware.
Special Work a Specialty.
Boat Rails, Stanchions, Etc.

MENTION THIS PAPER.

Katzenstein Self-Acting Metal Packing



for Piston Rods, Valve Stems, Etc., of every description, for Steam Engines, Pumps, Etc. Adopted and in use by the principal Iron Works, Steamship Companies, Mills and Engine Builders, Electric Light and Power Plants within the last twelve years in this and foreign Countries. Also FLEXIBLE TUBULAR METALLIC PACKING for Slip-Joints on Steam Pipes and for Hydraulic Pressure. Also METAL GASKETS for all sizes and shapes of flanges. Double-Acting Balanced Water-tight Bulkhead Doors for Steamers. Also Agents for the McColl-Cumming Patent Liquid Rudder Brake.

L. KATZENSTEIN & CO., General Machinists, Brass Finishers and Engineers' Supplies, 357 West Street, NewYork, N.Y.

The Pennsylvania Brass Works,

ERIE, PA.

Automatic Piston or Mocking Bird Whistles. Special Whistles made to order. Penna. Steam Flue Cleaner. Water Gages, Penna. Gage Cocks, Air Cocks, Oil Cups, Brass and Bronze Castings a Specialty.

E. G. ASHLEY,

CHOICE FAMILY GROCERIES.

ALSO ALL KINDS OF

Fresh, Salt and Smoked Meats.

Vessel orders attended to day and night. Goods delivered by Steam Yacht "Maggie D."

36 & 38 Summit Street. TOLEDO, O

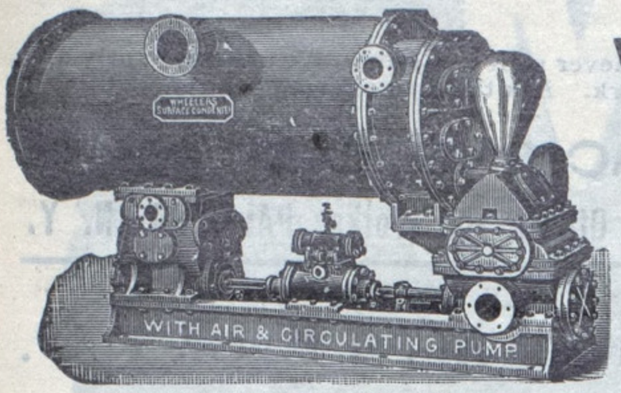
Now is the time to make your plans for your winter California trip. Ask agents of the Nickel Plate road about low rates and connections with the fast California trains out of Chicago. 488-52

Wheeler Condenser & Engineering Co.,

39 & 41 CORTLANDT STREET, NEW YORK.

WHEELER'S IMPROVED SURFACE CONDENSERS

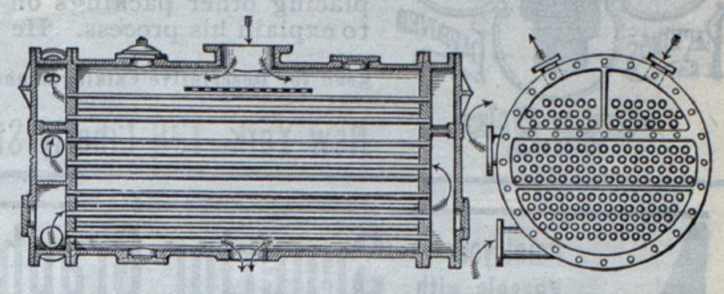
Mounted upon Combined Air and Circulating Pumps.



WHEELER SURFACE CONDENSER,
Mounted on Combined Air and Circulating Pumps.

Sole Proprietors and Manufacturers of the
WHEELER STANDARD SURFACE CONDENSER.
WHEELER ADMIRALTY SURFACE CONDENSER.
WHEELER LIGHT HALL SURFACE CONDENSER.
VOLZ PATENT COMBINED SURFACE CONDENSER AND FEED-WATER HEATER.
WHEELER FEED-WATER HEATER, AIR AND CIRCULATING PUMPS.
EDMISTON PATENT FEED WATER FILTER.

Send for Pamphlet, "Machinery for Small Boats, etc."



PATENT COMBINED SURFACE CONDENSER AND FEED-WATER HEATER.

P. M. CHURCH & CO.

SAULT STE. MARIE, MICH.,

Ship Chandlery, Hardware, Paints, Oils,

And all classes of

VESSEL SUPPLIES.

Coppersmith Shop in connection.

Corner Portage and Ashmun Sts.

TELEPHONES: - {OFFICE NO. 7. RESIDENCE NO. 4.

FACTS CONCLUSIVE.

We expect your patronage because the Nickel Plate Road operates conveniently scheduled trains equipped with unexcelled dining cars and luxurious sleepers between Chicago, Cleveland, Erie, New York and Boston. Lowest rates. 487-52

Eight Elegant . . .

PHOTOGRAVURES

SIZE, 10 x 17 INCHES.

Whaleback Steamer Christopher Columbus,
STATE of OHIO—STATE of NEW YORK,
Steel Ship Builders,
Steamer ARTHUR ORR,
English-Built Steamer TURRETT,
Dry Dock Representatives,
Schooner JOHN FITZPATRICK.

Complete set mailed to any address on receipt of 25c.

SMITH & SMITH,
144 Superior Street, CLEVELAND, O.

Nickel Plate Road, low rates and perfect service are all synonyms. A through sleeping car service between Chicago, Ft. Wayne, Cleveland, Erie, Buffalo, New York and Boston. 491-52

THE CHASE MACHINE COMPANY,

MACHINISTS, ENGINEERS AND BLACKSMITHS,

MANUFACTURERS OF

Land & Marine Engines & Steam Pumps,

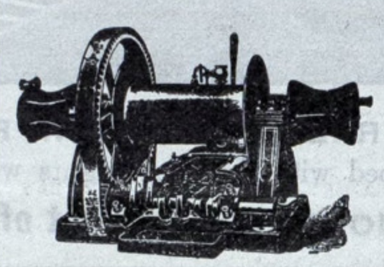
SOLE OWNERS AND MANUFACTURERS OF THE

CHASE AUTOMATIC FOG WHISTLE MACHINE,

IN USE ON NEARLY ALL LAKE STEAMERS.

Agents for ASBESTOS STEAM, BOILER AND PIPE COVERING.

Telephone 994. **111 Elm Street, CLEVELAND, O.**



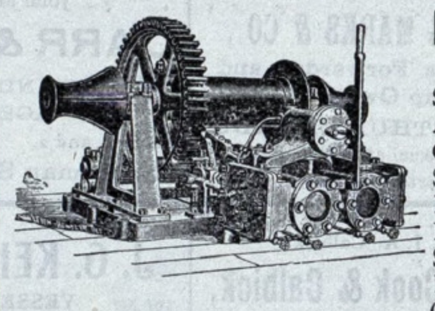
JACKSON & CHURCH,

BUILDER OF DUPLEX HOISTING AND DECK ENGINES.

Plain Finished and Automatic **ENGINES,** From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, Marine and Locomotive **BOILERS** Strictly First-Class and Highest Test.

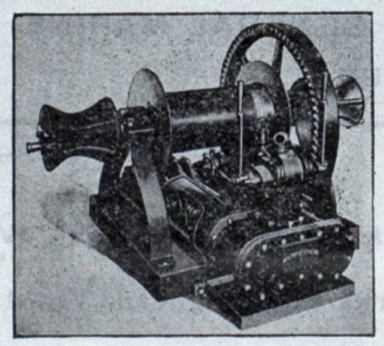
SEND FOR CIRCULAR AND PRICES. **SAGINAW, MICH.**



DECK AND DOCK HOISTS

Our Hoists will be found on the following boats: Tugs—Superior, Sumner, Sweepstakes, Winslow, J. K. Emmett, Acme, Mockingbird, Waldo Avery, Reliance, John Owen, Charlton, Howard, Duncan City, Chamberlain, Balize, Sampson, Westover, Gladiator, W. B. Castile, Home Rule, Robert Weideman, Boscobel and Peter Smith; Propellers—Metamora, Abercom, Penobscot, J. J. McWilliams, I. W. Stephenson, John W. Pauly; Barges—Jenness, Noquebay, Mantanee. Also in use by F. W. Wheeler & Co., W. B. City, Mich., Blood and Hart, Marine City, Mich., Michigan Salt Works, Marine City, Doty Bros,, Pile Drivers, Toronto, Canada.

MARINE IRON CO., - - - - BAY CITY, MICH.



DECK HOISTS

Coal and Contractors' Hoists,
Steam Steering Gears and
Conveying Machinery
For all Purposes.

MANUFACTURED BY **W. H. WHITTEMORE,**

WRITE FOR PRICES. *WEST BAY CITY, MICH.*

Nickel Plate Road, low rates and perfect service are all synonyms. A through sleeping car service between Chicago, Ft. Wayne, Cleveland, Erie, Buffalo, New York and Boston. 491-52

FOR SALE CHEAP.

GOOD TUGS.

18 to 22-inch cylinders. All in good condition. Address

HIGGIE & SHAW, 1 Franklin St., Chicago.

DRAWING AND ROUGH SKETCHING

For Marine Engineers. Just published, price $2.00, postage prepaid. Sixth edition, 13th thousand, enlarged to 226 pages and 100 plates and diagrams. IN TWO PARTS BOUND IN ONE VOLUME. By

JAMES DONALDSON, Consulting Engineer,
25 Tower Buildings, LIVERPOOL.

ALSO

DONALDSON'S

ENGINEERS' ANNUAL AND ALMANAC

FOR THE YEAR 1896.

A record of progress and events in connection with steam shipping. Price 35 cents, postage prepaid.

FRANKLIN HOUSE

Corner Bates and Larned sts., only a block from Woodward and Jefferson aves.

DETROIT, MICH.

The house has been **thoroughly renovated** and is in the heart of the city, convenient to all car lines, depots and boat landings.

Per Day. $1.50. **H. H. JAMES.**

To Owners of Excursion Steamers.

Bids for furnishing steamer and conducting passenger traffic to and from Woodlawn Beach for season of 1896 will be entertained at the office of the Company, 27 Lewis Block, 13½ East Swan Street, Buffalo, N. Y.

For Particulars please write

WOODLAWN BEACH CO.
HUGH C. MAHARG, Sec'y.

The Nickel Plate Road operates a perfect passenger service, composed of first and second-class day coaches attended by colored porters. Excellent dining cars and through sleeping cars to Chicago, Cleveland, Buffalo, New York and Boston. Rates always the lowest. 490-52

LOOK OUT FOR . . .

GRAHAM'S COAL DOCK,

Foot of Twenty-first Street, **DETROIT, MICH.**

All modern facilities for quick dispatch.
Widest point on River.
No interference from Car or Ferry Boats.

JAMES GRAHAM,
DETROIT, MICH.

TELEPHONE 2083.

J. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.

TUG MONARCH—Engine Compound, Cylinder 16 & 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.
TUG DELTA—Cylinder 20 by 22. Steam Pressure allowed, 105 lbs.
TUG OWEN—Cylinder 20 by 20, Steam Pressure allowed, 104 lbs.

CENTRIFUGAL PUMPS. **SEVEN AND FOURTEEN INCH SUCTION.**

Nautical Watch Chain.

SOLID GOLD. SHIP-SHAPE IN EVERY DETAIL.

Sheaves work, snatch block opens out and seizings are passed correctly.

MORGAN A. ROBERTSON,
26 John Street, New York

Send for Descriptive Circular.

CRANDALL'S PATENT PACKINGS.

FOR STEAM, WATER AND AMMONIA.

Not having been subjected to the injurious chemical action of boiling oil, outlast all others, and never melt and gum. We are constantly displacing other packings on Lake and Ocean Steamers, and can guarantee our goods for marine work. Ask the man offering "the same thing" to explain his process. He boils his goods in oil.

Send for Descriptive Catalogue and Samples.

CRANDALL PACKING CO.

New York, 136 Liberty Street. Chicago, 51 S. Canal Street. Main Offices and Works, PALMYRA, N. Y.

Paint your Vessels with **Superior Graphite Paint**

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments.
Strictly anti-rust, and most durable and economical.

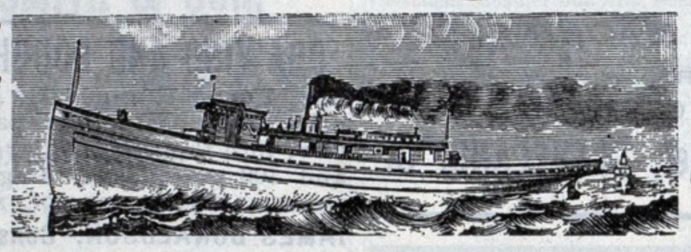
DETROIT GRAPHITE MFG. CO. 542 River St., Detroit, Mich.

WHITTON & BATES, Agents, 503 Perry-Payne Building, Cleveland, O.

H. A. HAWGOOD, Pres't. PHILIP MINCH, Vice-Pres't. GEO. ELSEY, Jr., Gen'l Mang'r. J. A. SMITH, Sec'y. J. R. SPRANKLE, Treas

The Cleveland Tug Company,

First-class Tugs, Steam Pumps, Divers, Hawsers, Lifting Screws, Etc., furnished Promptly on Orders by Telegraph or otherwise.



Steamers when outside wanting our Tugs, blow one long whistle and as many short ones as they want tugs.

OPEN DAY and NIGHT. DOCK and OFFICE FOOT of FRONT ST.

Long Distance Telephone 725. Cleveland, Ohio.

C. D. THOMPSON, Manager. C. L. BOYNTON, Sec. & Treas.

THOMPSON TUG LINE,

PORT HURON, MICH.

Tug Geo. E. Brockway, engine 28x30; Tug M. F. Merick, 2 engines 20x24, each; Tug James Ash, engine 14x16; Lighter Clinton, 650 tons capacity, with full wrecking outfit, stationed at Sault St. Marie, Mich.

Tug C. D. Thompson, engine 22½x26; Tug C. L. Boynton, compound engines, 17x34x30 in. stroke; Tug J. C. Ingram, engine 17x19; Lighter Mentor, 450 tons. Complete wrecking outfit stationed at Port Huron, Mich. Sch. John Wesley, 85 tons.

The "CINCINNATI" Automatic
STEAM STEERING GEAR

Simple, Powerful Machine. Noiseless and Sure. Send for Circular.

FRONTIER IRON WORKS, Detroit, Mich.,
AGENTS FOR THE LAKES.

AMERICAN STEEL BARGE CO.

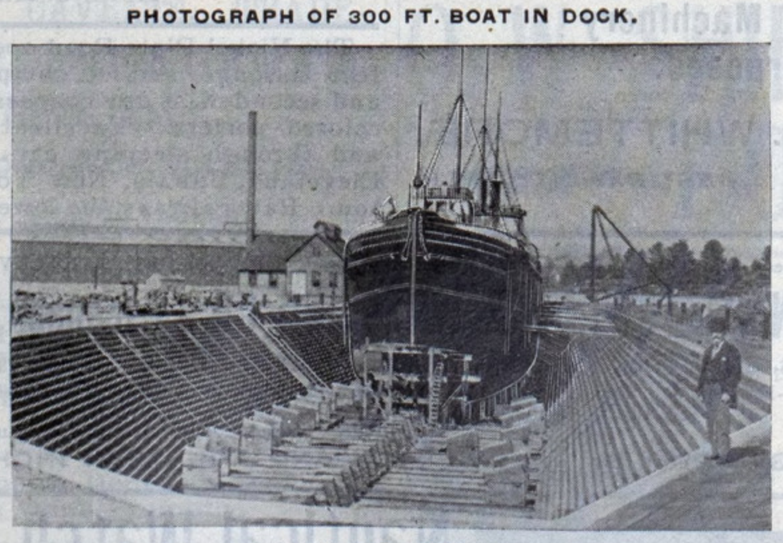
STEEL AND METAL SHIPS

OF ALL CLASSES BUILT ON SHORTEST POSSIBLE NOTICE AT OUR YARDS AT

WEST SUPERIOR, WIS., and also at EVERETT, WASH.

PHOTOGRAPH OF 300 FT. BOAT IN DOCK.

Plates and Material Always on Hand to Repair all kinds of Metal Ships in Shortest Time.



Best Quality of Oak in Stock for Repairing Wooden Vessels of all Classes.

SIZE OF DOCK

Length, Extreme	537 feet.	Entrance, Top,	55 feet 9 in.
Breadth, Top,	90 " 4 in.	Entrance, Bottom	50 "
Breadth, Bottom	52 "	Depth over Sills	18 "

LARGEST DRY DOCK ON THE LAKES.

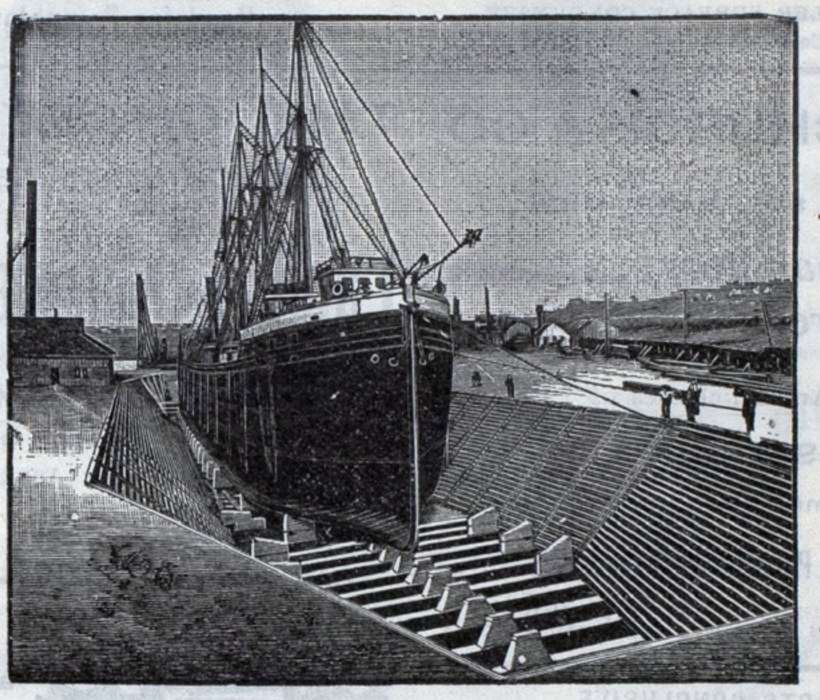
PRICES FOR REPAIRS AND DOCKING SAME AS AT LOWER LAKE PORTS.

SUPERIOR, WIS.

A NUMBER OF PROPELLER WHEELS IN STOCK AT DRY DOCK.

THE SHIP OWNERS DRY DOCK CO.

Largest DOCK YARD on the GREAT LAKES.



Capacity with Two Docks to Dock the Largest Ships on the Lakes.

GENERAL REPAIR WORK PROMPTLY ATTENDED TO.

Being equipped with Lucigen Lights we can do work at night as well as day.

TELEPHONE 1635. Foot of Weddell St., CLEVELAND, O.

ESTABLISHED 1857.
THOMAS MARKS & CO.,
Merchants, Forwarders and Ship Owners.
PORT ARTHUR, CANADA.
N. B.—Special attention given to chartering vessels.

Calvin Carr. G. C. Blair. John Mitchell.
CARR & BLAIR
VESSEL AND INSURANCE AGENTS,
Rooms 1 and 2. Tel. Main 869.
12 Sherman St. CHICAGO.

A. A. Parker. James W. Millen. B. W. Parker.
PARKER & MILLEN,
Vessel & Insurance Agents.
Iron Ore & Coal Cargoes a Specialty.
Rooms 3 & 4 15 Atwater St., West.
DETROIT, MICH.

C. F. Palmer. H. W. Cook. Capt. J. A. Calbick.
Palmer, Cook & Calbick,
Vessel Agents and Underwriters,
No. 6 Sherman Street, Chicago, Ill.
Telephone, Main 3952.

J. G. Keith. D. Sullivan.
J. G. KEITH & CO.
VESSEL AND INSURANCE AGENTS,
140 and 141 Rialto Bldg. CHICAGO.
Telephone No. 3658.

JOHN PRINDIVILLE,
VESSEL AND INSURANCE AGENT,
12 Sherman Street,
Telephone Main 129. CHICAGO.

C. A. MACDONALD & CO.,
GENERAL MARINE INSURANCE AGENTS.
RIALTO BUILDING, CHICAGO, ILL.

THOS. WILSON,
MANAGING OWNER WILSON'S TRANSIT LINE,
General Forwarder, Freight and Vessel Agent. CLEVELAND, O.

C. R. JONES & CO., VESSEL AGENTS
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.
MITCHELL & CO., Vessel and Insurance Agents,
Office Telephone, 767.
Residence John Mitchell, 3506.
508-509-510 Perry-Payne Building,
CLEVELAND, O.

JEFFERY'S MARINE GLUE
For Paying Seams of Decks and other Purposes.
L. W. FERDINAND & CO., BOSTON, MASS.
SEND FOR CIRCULAR.